

October 17, 2014

Project No. 133-99732.003

Tom Gainer, PE
Senior Environmental Engineer
Oregon Department of Environmental Quality
Northwest Region
2020 SW 4th Avenue, Suite 400
Portland, OR 97201

RE: STORMWATER SEDIMENT SAMPLING AND CLEANOUT REPORT, 4927 NORTHWEST FRONT AVENUE, PORTLAND, OREGON

Dear Mr. Gainer:

On behalf of BDC Properties, LLC (BDC), Golder Associates Inc. (Golder) completed a sediment characterization and catch basin cleanout of the property located at 4927 Northwest Front Avenue, Portland, Oregon 97210 (Property). Sediment sampling and cleanout activities were conducted as a result of the recommendations made in *Stormwater Sediment Sampling and Cleanout Report* dated December 2, 2013¹.

This letter report summarizes these activities and findings.

1.0 CATCH BASIN SEDIMENT SAMPLING

Golder collected catch basin sediment samples from the Property on September 2, 2014. Each of the 10 catch basins onsite, with the exception of CB-1, is equipped with a CleanWay filter system. The CleanWay systems are equipped with a plastic insert that fits inside the 27-inch diameter catch basin opening. The insert has a 15-inch diameter opening, which is equipped with a filtration bag and a metal basket that fits inside the bag. The metal basket catches large particulate and debris, and the filter bag is designed to trap fine particulate and absorb oil and grease that may pass through. CB-1 is equipped with a fabric sediment filter only.

1.1 Estimated Sediment Volume

The amount of sediment accumulated in the catch basin was measured and recorded on a field sampling data sheet (FSDS) immediately prior to sample collection. The metal basket insert contained the majority of the solids, with de minimus amounts of solids in the filter bag. Table 1 summarizes the measured sediment levels, and lists the total estimated volume of sediment in each basin.

Basins with negligible amounts of sediment were reported as “<1” inch. The volumes are estimated based on the measured depth of the sediment and the diameter of the metal basket (except for CB-1, which is only equipped with a fabric filter).

¹ Golder Associates Inc. (Golder). 2013. Sediment Sampling and Cleanout Report, 4927 NW Front Ave, Portland, OR, letter to Oregon Department of Environmental Quality, dated December 2.



The total estimated volume of sediment in all of the catch basins was 4.69 cubic feet (ft³). During the 2013 sampling event, the total estimated volume of was sediment was 8.5 ft³. The 2014 sediment volume is approximately 55% of the total sediment volume in 2013.

1.2 Sediment Sampling and Analytical Results

Catch basin sediments were collected and analyzed for polychlorinated biphenyls (PCBs), polycyclic aromatic hydrocarbons (PAHs), and total metals (ALS Environmental K1308048). PAHs and total metals were collected as composite samples of two catch basins with similar drainage patterns and exposure areas. PCBs were collected from individual basins with the goal of further characterizing the potential source of PCB concentrations observed in previous environmental investigations.

A sufficient amount of sediment from the metal basket was collected using a stainless steel trowel, and was homogenized in a stainless steel bowl. The sampling tools were decontaminated before collecting each sample and between each sample location. Composite samples for PAH and total metals were created by homogenizing an equal amount of sediment from two relatively located catch basins. The samples were homogenized in a stainless steel bowl using a stainless steel trowel. Composite 1 contained sediment from CB-1 and CB-5, Composite 2 contained sediment from CB-2 and CB-6, Composite 4 contained sediment from CB-7 and CB-8, and Composite 5 contained sediment from CB-9 and CB-10. A composite of CB-3 and CB-4 was not taken because of an inadequate amount of sediment in CB-4 to take both individual and composite samples.

Analytical results from each sample are presented in Sections 1.3, 1.4 and 1.5 of this report and in Tables 2, 3, and 4 (attached). The Joint Source Control Strategy (JSCS) Screening Level Values (SLVs) from the *Portland Harbor Joint Source Control Strategy, Table 3-1* (DEQ and EPA 2005)², are presented for comparison in Tables 2, 3 and 4. In addition, the analytical results were compared to the Sediment Charts presented in Appendix E of the *DEQ Guidance for Evaluating the Stormwater Pathway at Upland Sites*³ (Sediment Charts). These charts are not being considered a conclusive line of evidence.

1.3 Polychlorinated Biphenyls (PCBs)

PCB Aroclor 1254 was detected in all catch basins on the Property. Catch basins CB-8 and CB-9 had detected concentrations of Aroclor 1254 above the JSCS SLVs, with CB-8 containing the highest concentration at 0.53 mg/kg. With the exception of Aroclor 1254, no other detected concentrations of PCBs were found to exceed JSCS SLVs.

- Aroclor 1242 was detected in all catch basins on the Property
 - CB-8 had the highest detected concentration at 0.072 mg/kg.
- Aroclor 1260 was detected in all catch basins with the exception of CB-3 and CB-4.
 - CB-8 had the highest detected concentration at 0.1 mg/kg.
- Aroclor 1268 was detected in CB-1, CB-2, CB-5, and CB-6.
 - CB-2 had the highest detected concentration at 0.044 mg/kg.

The Sediment Chart for Total PCBs shows “typical” concentrations observed on industrial sites in the Portland Harbor area between 0 and approximately 0.15 milligrams per kilogram (mg/kg). Total PCB

² Oregon Department of Environmental Quality (DEQ) and United States Environmental Protection Agency (EPA). 2005. *Portland Harbor Joint Source Control Strategy*, dated December.

³ DEQ. 2010. *Guidance for Evaluating the Stormwater Pathway at Upland Sites*, dated January 2009, updated October.

concentrations in the catch basins range between 0.27 and 0.78 mg/kg, which are above the “typical” concentrations. These values are summarized in Table 5.

The exceedance quotient (EQ) is a value determined by taking the quotient of the sample result and the applicable JSCS SLV. The EQ represents the ratio of how much a sample result exceeds the JSCS SLV. The EQ values are between 0 and 1 for the majority of the individual PCB Aroclor results. However, the EQs for Total PCBs range between 541 and 1,800. The EQs are summarized in Table 6.

As compared to the 2013 sediment sampling event, there was an observed increase in Total PCB concentrations in CB-3 (44%) and CB-7 (171%). The remaining catch basins that were sampled in both 2013 and 2014 showed either a decrease or no change in Total PCB concentrations in 2014 (between 2% and 44% decrease). These values are also summarized in Table 2.

1.4 Polycyclic Aromatic Hydrocarbons (PAHs)

PAHs were detected in all composite samples collected on the Property, and all samples contained at least one chemical above the JSCS SLVs. Table 3 presents the analytical results of the PAHs compared to the JSCS SLVs.

PAH concentrations are highest in catch basins on the east side of the Property (Composite 1 and 2), and decrease in catch basins near the west side of the Property (Composites 4 and 5).

The Sediment Chart for Total PAHs shows “typical” concentrations between 0 and approximately 15,000 micrograms per kilogram (µg/kg). Total PAH concentrations observed in composite samples 1 and 2 are at 21,401 and 74,180 µg/kg, respectively, which are above the “typical” concentrations observed on industrial sites in the Portland Harbor area. These values are summarized in Table 5.

The EQs are between 0 and 9 for the majority of the PAH results. Composite 2 (and/or Composite 2 duplicate) have an EQ >10 for 2-Methylnaphthalene, Acenaphthylene, Phenanthrene, and Indeno(1,2,3-cd)pyrene. The EQs are summarized in Table 6.

A comparison between the total PAH 2013 results and the 2014 results show that there was a decrease in Total PAH concentrations in Composites 1 and 2 (65% and 19%, respectively) and an increase in Composite 4 (46%). There was relatively no change in Total PAH concentrations in Composite 5.

1.5 Total Metals

Total metals were detected in all composite samples collected on the Property. Table 4 presents the analytical results of the Metals compared to the JSCS SLVs.

Metals exceeding JSCS SLVs included Arsenic, Cadmium, Chromium, Copper, Lead, Mercury, Nickel, and Zinc.

- Arsenic was detected in all composites and exceeded JSCS SLVs in Composites 1, 2, 5, and in CB-3.
 - The highest concentration of Arsenic was found in CB-3 at 16.4 mg/kg.
- Cadmium was detected in all composites and exceeded JSCS SLVs in Composites 2, 2 Duplicate, 4, 5, CB-3, and CB-4.
 - The highest concentration of Cadmium was found in CB-4 at 6.66 mg/kg.
- Chromium was detected in all composites and exceeded JSCS SLVs in Composites 1 and 2, and in CB-3 and CB-4.
 - The highest concentration of Chromium was found in CB-4 at 301 mg/kg.
- Copper was found in all composites and exceeded JSCS SLVs in all composites.

- The highest concentration of Copper was found in Composite 1 at 544 mg/kg.
- Lead was found in all composites and exceeded JSCS SLVs in all composites.
 - The highest concentration of Lead was found in CB-4 at 247 mg/kg.
- Mercury was detected in all composites and exceeded JSCS SLVs in all composites except for Composite 1.
 - The highest concentration of Mercury was found in CB-4 at 0.251 mg/kg.
- Nickel was detected in all composites and exceeded JSCS SLVs in all composites except for in Composite 5.
 - The highest concentration of Nickel was found in Composite 1.
- Zinc was detected in all composites and exceeded JSCS SLVs in all composites.
 - The highest concentration of Zinc was detected in Composite 1 at 2,230 mg/kg.

Metals not exceeding JSCS SLVs included Barium, Manganese, Selenium, and Silver. Each of these metals, with the exception of Selenium, was detected in every composite. The only detection of Selenium was in Composite 5 at 0.9 mg/kg. The highest concentration of Barium was found in Composite 2 at 519 mg/kg. The highest concentration of Manganese was found in Composite 1 at 725 mg/kg. The highest concentration of Silver was found in Composite 5 at 1.1 mg/kg.

The Sediment Chart for metal levels shows “typical” concentrations of pollutant metals on industrial sites in the Portland Harbor area. A detailed comparison between the Sediment Chart can be found in Table 5.

- Cadmium, nickel and zinc concentrations observed in composite samples 1 and 2 are above the “typical” concentrations.
- CB-3 had above “typical” concentrations of chromium and nickel.
- CB-4 had above “typical” concentrations of cadmium, chromium, nickel and zinc.

The EQs are between 0 and 9 for the majority of the Total Metals results. Composite 5 and CB-4 have EQs for Lead of 12 and 15, respectively. The EQs are summarized in Table 6.

1.6 Quality Assurance/Quality Control

One duplicate sample was collected of Composite 2. The goal of collecting a duplicate of a composite sample is to assess the variability of the chemical concentration in the sampled media. The relative percent difference (RPD) was calculated for each PAH, and an average RPD was calculated. The average RPD is 51%, with a range of RPDs for each analyte between 38% and 70%.

2.0 CONCLUSIONS

River City Environmental was contracted to remove and replace the existing filters and clean out the accumulated sediments in the catch basins. The cleanout was completed on September 12, 2014.

Based on the analytical results from this sediment sampling event, there still appears to be unknown source(s) of PCBs, PAHs, and select total metals on the Property contributing to concentrations above the JSCS SLVs. These contaminants of interest are typically known to agglomerate to sediments. Therefore, controlling the suspended solids in stormwater on site will likely control the contaminants of interest on the Property. Golder proposes to complete a BMP evaluation on the site to study the current sediment control devices installed. This study will include collecting stormwater at the final discharge point (the manhole at the northwest corner of the Property), and completing a particulate size study. . Golder proposes to complete this study before the end of 2014.

Should you have any questions or comments regarding this letter report, please direct them to Audrey Herschberger at 503-607-1820 or aherschberger@golder.com.

Sincerely,

GOLDER ASSOCIATES INC.



Audrey Herschberger, PE
Project Environmental Engineer



Dave Seluga
Associate

cc: Bradley Boland, BDC Properties LLC

SH/AH/DS

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Table 1. Sediment Measures

Catch Basin	Sediment Depth (inches)	Estimated Volumes (cubic feet)¹
CB-1 ²	3.5	0.27
CB-2	9.5	0.73
CB-3	8	0.61
CB-4	<1	0.04
CB-5	5.5	0.42
CB-6	7	0.54
CB-7	2	0.15
CB-8	8	0.61
CB-9	8	0.61
CB-10	9	0.69
TOTAL ESTIMATED SEDIMENT VOLUME		4.69

Notes:

The metal basket is approximately 13 inches in diameter at the bottom

Only sediment depths in the metal basket were measured during the sediment sampling event on 9/2/2014.

¹For those basins with a reported "<1" inch of sediment depth, Golder conservatively assumed 0.5 inches for volume.

²This catch basin was not fitted with a CleanWay filter insert, only a standard sediment filter.

Table 2. Analytical Results, PCBs

Sample Location	PCB Results (mg/kg)											
	Aroclor 1016	Aroclor 1221	Aroclor 1232	Aroclor 1242	Aroclor 1248	Aroclor 1254	Aroclor 1260	Aroclor 1262	Aroclor 1268	Total PCBs	2013 Total PCBs	% Change of Total PCBs (2013 to 2014)
CB-1	0.0085 U	0.0085 U	0.0085 U	0.023 J	0.0085 U	0.1	0.078 P	0.0085 U	0.029 J	0.23	Not Sampled	
CB-2	0.0085 U	0.0085 U	0.0085 U	0.041 J	0.0085 U	0.2	0.15	0.0085 U	0.044 J	0.435	Not Sampled	
CB-3	0.0087 U	0.0087 U	0.0087 U	0.053 J	0.0087 U	0.25	0.057 U	0.048 U	0.033 U	0.303	0.21	44% Increase
CB-4	0.01 U	0.01 U	0.01 U	0.041 J	0.01 U	0.17	0.03 U	0.023 U	0.027 U	0.211	0.21	0% No Change
CB-5	0.0085 U	0.0085 U	0.0085 U	0.03 J	0.0085 U	0.19	0.1	0.0085 U	0.031 J	0.351	Not Sampled	
CB-6	0.0097 U	0.0097 U	0.0097 U	0.11 J	0.0097 U	0.25	0.14	0.0097 U	0.041 J	0.541	Not Sampled	
CB-7	0.0086 U	0.0086 U	0.0086 U	0.027 J	0.0086 U	0.19	0.054 J	0.0086 U	0.014 U	0.271	0.1	171% Increase
CB-8	0.012 U	0.012 U	0.012 U	0.072 J	0.012 U	0.53	0.1 J	0.012 U	0.019 U	0.702	0.79	-11% Decrease
CB-9	0.014 U	0.014 U	0.014 U	0.049 J	0.014 U	0.39	0.09 J	0.014 U	0.019 U	0.529	0.54	-2% Decrease
CB-10	0.0085 U	0.0085 U	0.0085 U	0.027 J	0.0085 U	0.2	0.066 J	0.0085 U	0.0085 U	0.293	0.52	-44% Decrease
JSCS SLV	0.53	NS	NS	NS	1.5	0.3	0.2	NS	NS	0.00039	0.00039	

Notes:

NS: no screening level value

Red bold text indicates reported concentration exceeds JSCS screening criteria

U: The analyte was not detected at or above the MRL shown

J: The result is an estimated value

P: The relative percent difference is greater than 40% between the two analytical results

Table 3. Analytical Results, PAHs

Sample Location	Polycyclic Aromatic Hydrocarbon Results (µg/kg)																			
	Naphthalene	2-Methylnaphthalene	Acenaphthylene	Acenaphthene	Fluorene	Phenanthrene	Anthracene	Fluoranthene	Pyrene	Benz(a)anthracene	Chrysene	Benzo(b)fluoranthene	Benzo(k)fluoranthene	Benzo(a)pyrene	Indeno(1,2,3-cd)pyrene	Dibenz(a,h)anthracene	Benzo(g,h,i)perylene	Total PAHs	2013 Total PAHs	% Change of Total PAHs (2013 to 2014)
Composite 1	270	1,100	41	1,300	810	4,300	770	3,900	2,800	900	1,500	1,200	460	760	560	120	610	21,401	60,860	-65% Decrease
Composite 2	380	1,800	72	2,700	1,500	7,900	1,500	6,900	5,600	2,200	3,100	3,000	1,100	2,000	1,300	300	1,500	42,852	52,950	-19% Decrease
Composite 2 Duplicate	600	2,700	120	4,400	3,000	15,000	3,100	12,000	9,700	3,900	4,900	4,900	1,700	3,400	2,100	460	2,200	74,180	Not Sampled	
Composite 4	88	94	30	82	120	920	110	1,000	1,700	300	500	490	120	320	220	65	720	6,879	4,699	46% Increase
Composite 5	290	330	19	40	66	560	43	560	880	150	320	330	100	160	160	40	350	4,398	4,409	0% No Change
CB-3	130	190	47	43	130	890	64	860	1,600	220	790	420	89	270	210	61	740	6,754	Not Sampled	
CB-4	110	120	35	48	78	820	100	1,000	1,500	230	800	610	5 U	270	220	48	610	6,604	Not Sampled	
JSCS SLV	561	200	200	300	536	1,170	845	2,230	1,520	1,050	1,290	NS	13,000	1,450	100	1,300	300	NS	NS	

Notes:

Composite 1 = CB-1 & CB-5; Composite 2 = CB-2 & CB-6; No Composite 3, use CB-3 & CB-4; Composite 4 = CB-7 & CB-8; Composite 5 = CB-9 & CB-10

NS: no screening level value

Red bold text indicates reported concentration exceeds JSCS screening criteria

J: The result is an estimated value detected between the method detection limit (MDL) and MRL

U: The analyte was not detected at or above the MRL shown

Table 4. Analytical Results, Total Metals

Sample Location	Total Metal Results (mg/kg)											
	Arsenic	Barium	Cadmium	Chromium	Copper	Lead	Manganese	Mercury	Nickel	Selenium	Silver	Zinc
Composite 1	11.4	439	1	265	544	53.7	725	0.056	279	0.9 U	0.4 J	2,230
Composite 2	9.2	519	2	154	315	156	583	0.113	97.3	0.8 U	0.4 J	2,010
Composite 2 Duplicate	6.9	291	1.48	101	190	158	485	0.121	62	0.8 U	0.2 J	1,130
Composite 4	4.2	246	1.4	107	212	69.9	315	0.111	55.5	0.9 U	0.6 J	1,110
Composite 5	7.7	240	1.32	67.4	296	196	304	0.148	44.8	0.9 J	1.1	661
CB-3	16.4	230	1.25	148	247	81.2	245	0.136	77.3	0.9 U	0.7 J	920
CB-4	5.6	447	6.66	301	359	247	392	0.251	174	0.8 U	1.0	1,580
JSCS SLV	7	NS	1	111	149	17	1,100	0.070	48.6	2	5	459

Notes:

Composite 1 = CB-1 & CB-5; Composite 2 = CB-2 & CB-6; No Composite 3, use CB-3 & CB-4; Composite 4 = CB-7 & CB-8; Composite 5 = CB-9 & CB-10

NS: no screening level value

Red bold text indicates reported concentration exceeds JSCS screening criteria

J: The result is an estimated value detected between the method detection limit (MDL) and MRL

U: The analyte was not detected at or above the MRL shown

Table 5. DEQ "Typical" Concentration Comparison

Sample Location	Total PCB Results (mg/kg)	Total PAH Results (µg/kg)	Total Metal Results (mg/kg)											
			Arsenic	Barium	Cadmium	Chromium	Copper	Lead	Manganese	Mercury	Nickel	Selenium	Silver	Zinc
Estimated DEQ Sediment Chart Concentration ¹	0 - 0.15	0 - 15,000	0 - 18.8	NA	0 - 4.0	0 - 137.5	0 - 6,500	0 - 300	NA	0 - 0.4	0 - 75	NA	0 - 1.4	0 - 1,500
Composite 1	-	21,401	11.4	439	1	265	544	53.7	725	0.056	279	0.9 U	0.4 J	2,230
Composite 2	-	42,852	9.2	519	2	154	315	156	583	0.113	97.3	0.8 U	0.4 J	2,010
Composite 2 Duplicate	-	74,180	6.9	291	1.48	101	190	158	485	0.121	62	0.8 U	0.2 J	1,130
Composite 4	-	6,879	4.2	246	1.4	107	212	69.9	315	0.111	55.5	0.9 U	0.6 J	1,110
Composite 5	-	4,398	7.7	240	1.32	67.4	296	196	304	0.148	44.8	0.9 J	1.1	661
CB-1	0.23	-	-	-	-	-	-	-	-	-	-	-	-	-
CB-2	0.44	-	-	-	-	-	-	-	-	-	-	-	-	-
CB-3	0.30	6,754	16.4	230	1.25	148	247	81.2	245	0.136	77.3	0.9 U	0.7 J	920
CB-4	0.21	6,604	5.6	447	6.66	301	359	247	392	0.251	174	0.8 U	1.0	1,580
CB-5	0.35	-	-	-	-	-	-	-	-	-	-	-	-	-
CB-6	0.54	-	-	-	-	-	-	-	-	-	-	-	-	-
CB-7	0.27	-	-	-	-	-	-	-	-	-	-	-	-	-
CB-8	0.70	-	-	-	-	-	-	-	-	-	-	-	-	-
CB-9	0.53	-	-	-	-	-	-	-	-	-	-	-	-	-
CB-10	0.29	-	-	-	-	-	-	-	-	-	-	-	-	-

Notes:

Composite 1 = CB-1 & CB-5; Composite 2 = CB-2 & CB-6; No Composite 3, use CB-3 & CB-4; Composite 4 = CB-7 & CB-8; Composite 5 = CB-9 & CB-10

¹ "Typical" concentrations are derived from the Sediment Charts provided in Appendix E of *Guidance for Evaluating the Stormwater Pathway at Upland Sites* (DEQ, 2010).

Red bold text indicates the value is in exceedance of the "typical" concentration level

J: The result is an estimated value detected between the method detection limit (MDL) and method reporting limit (MRL).

U: The analyte was not detected at or above the MRL shown

"-": The sample was not tested for the specified analyte

Table 6. Exceedance Quotients

Polychlorinated Biphenyls (mg/kg)											
Analyte	JSCS SLVs	CB-1	CB-2	CB-3	CB-4	CB-5	CB-6	CB-7	CB-8	CB-9	CB-10
Aroclor 1254	0.3	0	1	1	1	1	1	1	2	1	1
Aroclor 1260	0.2	0	1	0	0	1	1	0	1	0	0
Total PCBs	0.00039	590	1,115	777	541	900	1,387	695	1,800	1,356	751
Polynuclear Aromatic Hydrocarbons (µg/kg)											
Analyte	JSCS SLVs	Composite 1	Composite 2	Composite 2 (Dup)	Composite 4	Composite 5	CB-3	CB-4			
Naphthalene	561	0	1	1	0	1	0	0			
2-Methylnaphthalene	200	6	9	14	0	2	1	1			
Acenaphthylene	200	0	0	1	0	0	0	0			
Acenaphthene	300	4	9	15	0	0	0	0			
Fluorene	536	2	3	6	0	0	0	0			
Phenanthrene	1170	4	7	13	1	0	1	1			
Anthracene	845	1	2	4	0	0	0	0			
Fluoranthene	2230	2	3	5	0	0	0	0			
Pyrene	1520	2	4	6	1	1	1	1			
Benz(a)anthracene	1050	1	2	4	0	0	0	0			
Chrysene	1290	1	2	4	0	0	1	1			
Benzo(a)pyrene	1450	1	1	2	0	0	0	0			
Indeno(1,2,3-cd)pyrene	100	6	13	21	2	2	2	2			
Benzo(g,h,i)perylene	300	2	5	7	2	1	2	2			
Total Metals (mg/kg)											
Analyte	JSCS SLVs	Composite 1	Composite 2	Composite 2 (Dup)	Composite 4	Composite 5	CB-3	CB-4			
Arsenic	7	2	1	1	1	1	2	1			
Cadmium	1	1	2	1	1	1	1	7			
Chromium	111	2	1	1	1	1	1	3			
Copper	149	4	2	1	1	2	2	2			
Lead	17	3	9	9	4	12	5	15			
Manganese	1100	1	1	0	0	0	0	0			
Mercury	0.07	1	2	2	2	2	2	4			
Nickel	48.6	6	2	1	1	1	2	4			
Zinc	459	5	4	2	2	1	2	3			

Notes:

SLV not exceeded	Composite 1 = CB-1 & CB-5; Composite 2 = CB-2 & CB-6; No Composite 3, use CB-3 & CB-4; Composite 4 = CB-7 & CB-8; Composite 5 = CB-9 & CB-10
1-10	This table includes analytes that:
11-100	1) have a JSCS SLV, and
101-1,000	2) were detected at concentrations greater than those SLVs.
1,001 - 10,000	JSCS SLV = Portland Harbor Joint Source Control Strategy Screening Level Value, Table 3-1, December 2005

0 = detected concentration does not exceed the JSCS SLV

Exceedance Quotient = analytical result / JSCS SLV

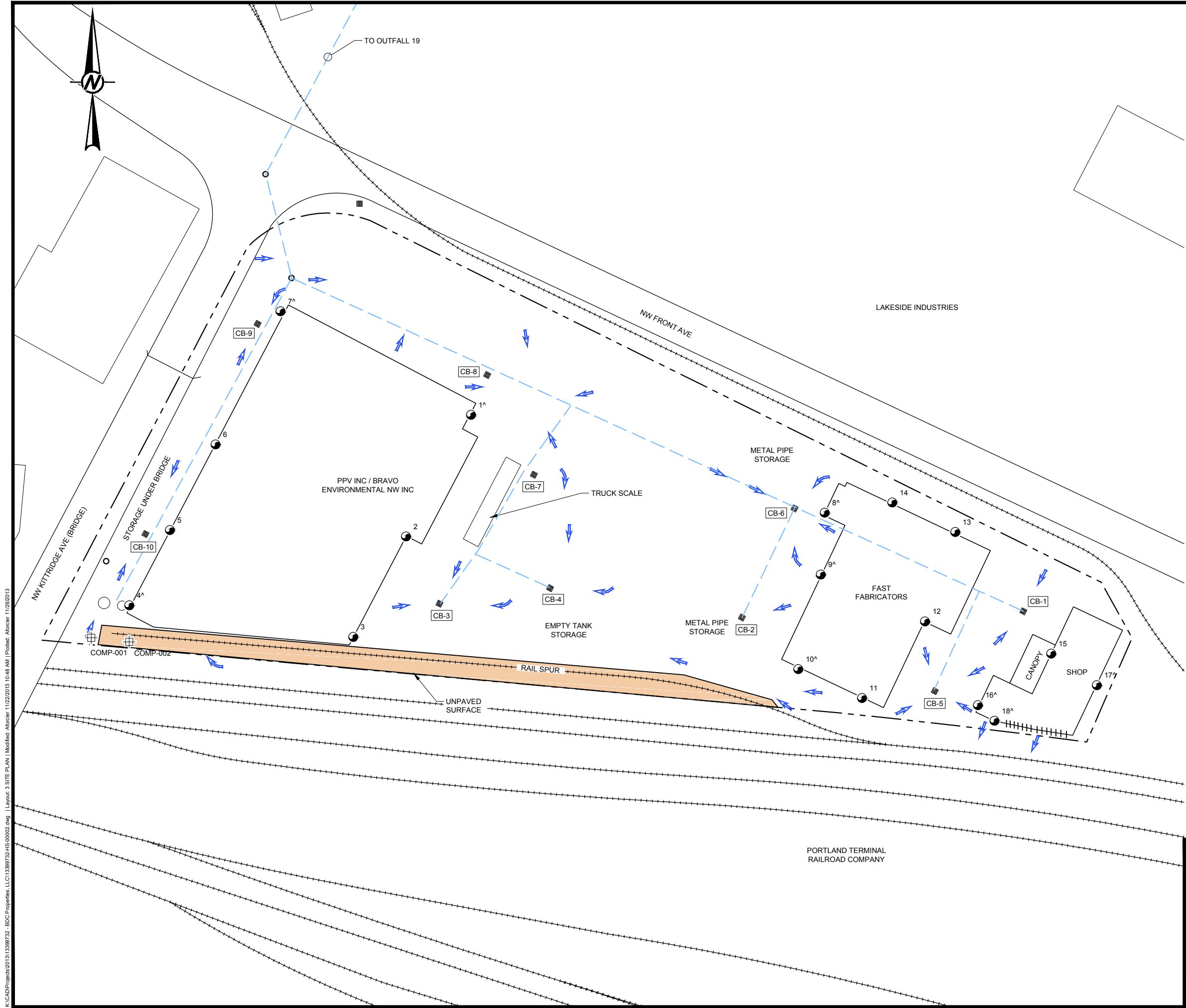
Blue shading means the detected concentration is between 1 and 10 times the JSCS SLV

Green shading means the detected concentration is between 11 and 100 times the JSCS SLV

Yellow shading means the detected concentration is between 101 and 1,000 times the JSCS SLV

Red shading means the detected concentration is between 1,001 and 10,000 times the JSCS SLV

FIGURE



LEGEND

SITE BOUNDARY

RAILROAD TRACKS

SUBSURFACE STORMWATER PIPELINES

CATCH BASIN

CB-7

CATCH BASIN IDENTIFICATION

MANHOLE

SURFACE WATER FLOW DIRECTION

UNPAVED SURFACE

ROOF DRAIN

COMP-001

COMPOSITE SAMPLE LOCATIONS

NOTES

*CATCH BASIN LOCATIONS ARE APPROXIMATE

*Unless otherwise noted, roof drains are connected through pipes to the ground

1^ A pipe runs from the overhang and drains into this roof drain

4^ Lower half of pipe missing, but there is a drain underneath. Splatter drains to CB-10

7^ No ground connection, all water drains to CB-9

8^ Pipe missing entirely, all water drains to CB-6

9^ Connection to drain askew, some water drains to CB-6

10^ Connection to drain missing, some water drains to the railroad

16^ No ground connection, all water drains to CB-5

17^ Lower half of pipe missing, drains into soil

18^ No ground connection, all water drains to railroad

A. Trailers have roof drains, but no ground connection. All water drains to CB-1

B. Some sheet flow off roof overhang expected, water drains to railroad

K:\CAD\Projects\2013\1339732 - BDC Properties, LLC\1339732-HS-00002.dwg | Layout: 3 SITE PLAN | Modified: Alocer 11/22/2013 10:49 AM | Plotted: Alocer 1/26/2013

PROJECT

BDC PROPERTIES, LLC
STORMWATER SCE
PORTLAND, OR

TITLE

SITE PLAN

Golder
Associates

PROJECT No.	133-99732-001		FILE No.	13399732-HS-00002	
DESIGN	AH	2013-06-14	SCALE	AS SHOWN	
CADD	SES	2013-06-14	FIGURE	1	
CHECK	AH	2013-06-14			
REVIEW					

APPENDIX A
ANALYTICAL REPORTS & GOLDER QA/QC VALIDATION

Matrix/Method: Sediment /PAHs (SVOC SIM) by EPA 8270D-SIM GC/MS SIM, Solids by EPA 160.3

Lab: ALS, Kelso

Project: BDC Properties

Validated by

jeel faruk

Date: 10/17/2014

SDG: K1409353

Proj. No. : 13399732.003

Sample Collection Dates: 9/2/2014

[illegible]

Note: X = Criteria were evaluated and not met. A = Criteria were evaluated and met. N = Data was not available for review. NA = Not applicable.

Matrix/Method: Sediment /PAHs (SVOC SIM) by EPA 8270D-SIM GC/MS SIM, Solids by EPA 160.3

Lab: ALS, Kelso

Project: BDC Properties

Comments:

SDG: K1409353

Proj. No.: 13399732.003

Case Narrative Notes:

Sample Notes and Discussion:

The result reported for Chrysene in sample CB-3 may contain a slight bias. The chromatogram indicated the presence of non-target background components. The matrix interference may have resulted in a slight high bias in the affected samples. The results were flagged with "X" to indicate the issue. DV Comment: Qualify results as estimated (I/UJ)

The results reported for Chrysene, Benzo(b)fluoranthene, and Benzo(k)fluoranthene in sample CB-4 may contain a slight bias. The chromatogram indicated the presence of non-target background components. The matrix interference may have resulted in a slight high bias in the affected samples. The results were flagged with "X" to indicate the issue. DV Comment: Qualify results as estimated (I/UJ)

Sample Collection Dates: 9/2/2014

Field Duplicate on Comp-2 and Duplicate: RPDs are all >35% with results < 5X RL. Poor reproducibility with soil samples due to high heterogeneity. No qualification is applied, but data user should be advised of poor performance.

One cooler had had a cooler temperature that exceeded the $4 \pm 2^{\circ}\text{C}$ criteria. Since the samples were placed into a refrigerator upon receipt, and the samples were on ice, no action was taken other than to note. Sufficient ice should be packed with samples that are delivered in times >24 hours from time of sampling.

Results are acceptable.

Matrix/Method: Sediment /PCBs by EPA 8082A GC/ECD, Solids EPA 160.3

Lab: ALS, Kelso

Project: BDC Properties

Validated by: 

Date: 10/17/2014

SDG: K1409353

Proj. No.: 13399732.003

Sample Collection Dates: 9/2/2014

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Cooler Temperature: 1.6, 7.5°C Login Receipt: ok Sample identification and validation criteria (per WP Level I, EPA NFG 2008, TA QA/QC criteria and analytical reference method. Case Narrative: See next page	K1409353-005 / CB-1	K1409353-006 / CB-2	K1409353-007 / CB-3	K1409353-008 / CB-4	K1409353-009 / CB-5	K1409353-010 / CB-6	K1409353-011 / CB-7	K1409353-012 / CB-8	K1409353-013 / CB-9	K1409353-014 / CB-10										
Completeness of analyses:	A	A	A	A	A	A	A	A	A	A										
Preservation:	X	X	X	X	X	X	X	X	X	X										
Holding times: Date Prepared: 9/9/2014 Date Analyzed: 9/17, 18/2014	A	A	A	A	A	A	A	A	A	A										
GC/MS Tuning (if applicable):	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA										
Initial Calibration Criteria:	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA										
Continuing Calibration Criteria:	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA										
Method Blanks:	A	A	A	A	A	A	A	A	A	A										
LCS/LCSD %R/RPD:	A	A	A	A	A	A	A	A	A	A										
Surrogate %R:	A	A	A	A	A	A	A	A	A	A										
MS/MSD:	A	A	A	A	A	A	A	A	A	A										
Internal Standards Performance:	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA										
Reporting Limits:	A	A	A	A	A	A	A	A	A	A										
Completeness of Analyte List:	A	A	A	A	A	A	A	A	A	A										
Field Duplicate Pair:	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA										
Equipment/Field Blank:	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA										

Note: X = Criteria were evaluated and not met. A = Criteria were evaluated and met. N = Data was not available for review. NA = Not applicable.

[illegible]

Matrix/Method: Sediment and Water/RCRA Metals by 6010C (ICP), 7471B (CVAA)										Lab: ALS, Kelso					Project: BDC Properties														
Validated by <i>Jel Lambert</i>										Date: 10/7/2013					SDG: K1409353					Proj. No.: 13399732.003									
															Sample Collection Dates: 9/2/2014														
Cooler Temperature: 1.6, 7.5°C Login Receipt: ok Sample identification and validation criteria (per WP Level I, EPA NFG 2010, TA QA/QC criteria and analytical reference method. Case Narrative: See next page										1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
										K1409353-001 / Comp 1	K1409353-002 / Comp 2	K1409353-003 / Comp 4	K1409353-004 / Comp 5	K1409353-007 / CB-3	K1409353-008 / CB-4	K1409353-015 / Duplicate													
Completeness of Analyses:										A	A	A	A	A	A	A													
Preservation:										X	X	X	X	X	X	X													
Holding Times: Date Prepared: 9/5, 8/2014 Date Analyzed: 9/5, 9/2014										A	A	A	A	A	A	A													
ICP/AA ICV/CCV (90-110%):										NA	NA	NA	NA	NA	NA	NA													
CVAA ICV/CCV (80-120%):										NA	NA	NA	NA	NA	NA	NA													
ICP Interference Check (80-120%):										NA	NA	NA	NA	NA	NA	NA													
Internal Standards:										NA	NA	NA	NA	NA	NA	NA													
ICP Serial Dilution (<10%D for >50X IDL):										NA	NA	NA	NA	NA	NA	NA													
Method Blanks:										X	X	X	X	X	X	X													
LCS %R (80-120%):										A	A	A	A	A	A	A													
Lab Duplicate, ≤20% RPD (≤35% for soils) for values ≥5X CRDL or ±CRDL (±2XCRDL for soils) for values ≤5X CRDL:										X	X	X	X	X	X	X													
MS/MSD:										X	X	X	X	X	X	X													
Reporting Limits:										A	A	A	A	A	A	A													
Completeness of Analyte List:										X	X	X	X	X	X	X													
Field Duplicate Pair:										NA	X	NA	NA	NA	NA	X													
Equipment/Field Blank:										NA	NA	NA	NA	NA	NA	NA													

Note: X = Criteria were evaluated and not met. A = Criteria were evaluated and met. N = Data was not available for review. NA = Not applicable.

Matrix/Method: Sediment and Water/RCRA Metals by 6010C (ICP), 7471B (CVAA)

Lab: ALS, Kelso

Project: BDC Properties

Comments:

SDG: K1409353

Proj. No.: 13399732.003

Case Narrative note:**Matrix Spike Recovery Exceptions:**

The matrix spike recoveries of Barium, Lead, and Nickel for sample Comp 1 were outside the ALS control criteria as a result of the heterogeneous character of the sample. The Relative Percent Difference (RPD) for the replicate analysis supported this. The variability between replicates was sufficient to bias the percent recoveries outside normal ALS control criteria. The associated QA/QC results (e.g. control sample, calibration standards, etc.) indicated the analysis was in control. No further corrective action was appropriate. DV Comment: Ba % MS/MSD out of control low. Qualify parent sample as estimated with a low bias (J-). Pb and Ni% MS/MSD out of control high. Qualify parent sample as estimated with a high bias (J+). No qualification was applied to other samples in group due to soil heterogeneity.

Sample Collection Dates: 9/2/2014**Relative Percent Difference Exceptions:**

The Relative Percent Difference (RPD) for the replicate analysis of Barium, Lead, Nickel and Zinc in sample Comp 1 was outside the normal ALS control limits. The variability in the results was attributed to the heterogeneous character of the sample. Standard mixing techniques were used, but were not sufficient for complete homogenization of this sample. DV Comment: qualify results for Ba, Pb, Ni, and Zn as estimated on sample Comp-1. No qualification was applied to other samples in group due to soil heterogeneity.

Field Duplicate on Comp-2 and Duplicate: RPDs > 35% for results >5X RL for Barium, Chromium, Copper, Nickel, Silver, and Zinc. Poor reproducibility with soil samples due to high heterogeneity. No qualification is applied, but data user should be advised of poor performance.

One cooler had had a cooler temperature that exceeded the $4 \pm 2^\circ\text{C}$ criteria. Since the samples were placed into a refrigerator upon receipt, and the samples were on ice, no action was taken other than to note. Sufficient ice should be packed with samples that are delivered in times >24 hours from time of sampling.

Method Blank contains low levels of Barium (0.56 J mg/kg), Cadmium (0.02 J mg/kg), Manganese (0.1 J mg/kg), and Zinc (0.2 J mg/kg). No action on Barium, Manganese, and Zinc; results are >10X RL. Qualify results > RL but < 10X RL as biased high (J+) (all samples except CB-4).

Chain of custody lists As, Ba, Cd, Cr, Pb, Ag, Se, and Hg as the required metals. Lab provided results for Cu, Mn, Ni, and Zn in addition to the requested metals. No action other than to note.

Results are acceptable.



ALS Environmental
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Kelso, WA 98626
T: +1 360 577 7222
F: +1 360 636 1068
www.alsglobal.com

September 26, 2014

Analytical Report for Service Request No: K1409353

Audrey Herschberger
Golder Associates, Inc.
9 Monroe Parkway, Suite 270
Lake Oswego, OR 97035

RE: BDC Properties/13399732

Dear Audrey:

Enclosed are the results of the samples submitted to our laboratory on September 03, 2014. For your reference, these analyses have been assigned our service request number K1409353.

Analyses were performed according to our laboratory's NELAP-approved quality assurance program. The test results meet requirements of the current NELAP standards, where applicable, and except as noted in the laboratory case narrative provided. For a specific list of NELAP-accredited analytes, refer to the certifications section at www.alsglobal.com. All results are intended to be considered in their entirety, and ALS Group USA Corp. dba ALS Environmental (ALS) is not responsible for use of less than the complete report. Results apply only to the items submitted to the laboratory for analysis and individual items (samples) analyzed, as listed in the report.

Please call if you have any questions. My extension is 3363. You may also contact me via Email at Lisa.Domenighini@alsglobal.com.

Respectfully submitted,

ALS Group USA Corp. dba ALS Environmental

Lisa Domenighini
Project Manager

LD/aj

Page 1 of 49

Acronyms

ASTM	American Society for Testing and Materials
A2LA	American Association for Laboratory Accreditation
CARB	California Air Resources Board
CAS Number	Chemical Abstract Service registry Number
CFC	Chlorofluorocarbon
CFU	Colony-Forming Unit
DEC	Department of Environmental Conservation
DEQ	Department of Environmental Quality
DHS	Department of Health Services
DOE	Department of Ecology
DOH	Department of Health
EPA	U. S. Environmental Protection Agency
ELAP	Environmental Laboratory Accreditation Program
GC	Gas Chromatography
GC/MS	Gas Chromatography/Mass Spectrometry
LOD	Limit of Detection
LOQ	Limit of Quantitation
LUFT	Leaking Underground Fuel Tank
M	Modified
MCL	Maximum Contaminant Level is the highest permissible concentration of a substance allowed in drinking water as established by the USEPA.
MDL	Method Detection Limit
MPN	Most Probable Number
MRL	Method Reporting Limit
NA	Not Applicable
NC	Not Calculated
NCASI	National Council of the Paper Industry for Air and Stream Improvement
ND	Not Detected
NIOSH	National Institute for Occupational Safety and Health
PQL	Practical Quantitation Limit
RCRA	Resource Conservation and Recovery Act
SIM	Selected Ion Monitoring
TPH	Total Petroleum Hydrocarbons
tr	Trace level is the concentration of an analyte that is less than the PQL but greater than or equal to the MDL.

Inorganic Data Qualifiers

- * The result is an outlier. See case narrative.
- # The control limit criteria is not applicable. See case narrative.
- B The analyte was found in the associated method blank at a level that is significant relative to the sample result as defined by the DOD or NELAC standards.
- E The result is an estimate amount because the value exceeded the instrument calibration range.
- J The result is an estimated value.
- U The analyte was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL.
DOD-QSM 4.2 definition : Analyte was not detected and is reported as less than the LOD or as defined by the project. The detection limit is adjusted for dilution.
- i The MRL/MDL or LOQ/LOD is elevated due to a matrix interference.
- X See case narrative.
- Q See case narrative. One or more quality control criteria was outside the limits.
- H The holding time for this test is immediately following sample collection. The samples were analyzed as soon as possible after receipt by the laboratory.

Metals Data Qualifiers

- # The control limit criteria is not applicable. See case narrative.
- J The result is an estimated value.
- E The percent difference for the serial dilution was greater than 10%, indicating a possible matrix interference in the sample.
- M The duplicate injection precision was not met.
- N The Matrix Spike sample recovery is not within control limits. See case narrative.
- S The reported value was determined by the Method of Standard Additions (MSA).
- U The analyte was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL.
DOD-QSM 4.2 definition : Analyte was not detected and is reported as less than the LOD or as defined by the project. The detection limit is adjusted for dilution.
- W The post-digestion spike for furnace AA analysis is out of control limits, while sample absorbance is less than 50% of spike absorbance.
- i The MRL/MDL or LOQ/LOD is elevated due to a matrix interference.
- X See case narrative.
- + The correlation coefficient for the MSA is less than 0.995.
- Q See case narrative. One or more quality control criteria was outside the limits.

Organic Data Qualifiers

- * The result is an outlier. See case narrative.
- # The control limit criteria is not applicable. See case narrative.
- A A tentatively identified compound, a suspected aldol-condensation product.
- B The analyte was found in the associated method blank at a level that is significant relative to the sample result as defined by the DOD or NELAC standards.
- C The analyte was qualitatively confirmed using GC/MS techniques, pattern recognition, or by comparing to historical data.
- D The reported result is from a dilution.
- E The result is an estimated value.
- J The result is an estimated value.
- N The result is presumptive. The analyte was tentatively identified, but a confirmation analysis was not performed.
- P The GC or HPLC confirmation criteria was exceeded. The relative percent difference is greater than 40% between the two analytical results.
- U The analyte was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL.
DOD-QSM 4.2 definition : Analyte was not detected and is reported as less than the LOD or as defined by the project. The detection limit is adjusted for dilution.
- i The MRL/MDL or LOQ/LOD is elevated due to a chromatographic interference.
- X See case narrative.
- Q See case narrative. One or more quality control criteria was outside the limits.

Additional Petroleum Hydrocarbon Specific Qualifiers

- F The chromatographic fingerprint of the sample matches the elution pattern of the calibration standard.
- L The chromatographic fingerprint of the sample resembles a petroleum product, but the elution pattern indicates the presence of a greater amount of lighter molecular weight constituents than the calibration standard.
- H The chromatographic fingerprint of the sample resembles a petroleum product, but the elution pattern indicates the presence of a greater amount of heavier molecular weight constituents than the calibration standard.
- O The chromatographic fingerprint of the sample resembles an oil, but does not match the calibration standard.
- Y The chromatographic fingerprint of the sample resembles a petroleum product eluting in approximately the correct carbon range, but the elution pattern does not match the calibration standard.
- Z The chromatographic fingerprint does not resemble a petroleum product.

ALS Group USA Corp. dba ALS Environmental (ALS) - Kelso
State Certifications, Accreditations, and Licenses

Agency	Web Site	Number
Alaska DEC UST	http://dec.alaska.gov/applications/eh/ehllabreports/USTLabs.aspx	UST-040
Arizona DHS	http://www.azdhs.gov/lab/license/env.htm	AZ0339
Arkansas - DEQ	http://www.adeq.state.ar.us/techsvs/labcert.htm	88-0637
California DHS (ELAP)	http://www.cdph.ca.gov/certlic/labs/Pages/ELAP.aspx	2795
DOD ELAP	http://www.denix.osd.mil/edqw/Accreditation/AccreditedLabs.cfm	L14-51
Florida DOH	http://www.doh.state.fl.us/lab/EnvLabCert/WaterCert.htm	E87412
Hawaii DOH	Not available	-
Idaho DHW	http://www.healthandwelfare.idaho.gov/Health/Labs/CertificationDrinkingWaterLabs/tabid/1833/Default.aspx	-
ISO 17025	http://www.pjllabs.com/	L14-50
Louisiana DEQ	http://www.deq.louisiana.gov/portal/DIVISIONS/PublicParticipationandPermitSupport/LouisianaLaboratoryAccreditationProgram.aspx	03016
Maine DHS	Not available	WA01276
Michigan DEQ	http://www.michigan.gov/deq/0,1607,7-135-3307_4131_4156---,00.html	9949
Minnesota DOH	http://www.health.state.mn.us/accreditation	053-999-457
Montana DPHHS	http://www.dphhs.mt.gov/publichealth/	CERT0047
Nevada DEP	http://ndep.nv.gov/bsdwlabservice.htm	WA01276
New Jersey DEP	http://www.nj.gov/dep/oqa/	WA005
North Carolina DWQ	http://www.dwqlab.org/	605
Oklahoma DEQ	http://www.deq.state.ok.us/CSDnew/labcert.htm	9801
Oregon – DEQ (NELAP)	http://public.health.oregon.gov/LaboratoryServices/EnvironmentalLaboratoryAccreditation/Pages/index.aspx	WA100010
South Carolina DHEC	http://www.scdhec.gov/environment/envserv/	61002
Texas CEQ	http://www.tceq.texas.gov/field/qa/env_lab_accreditation.html	T104704427
Washington DOE	http://www.ecy.wa.gov/programs/eap/labs/lab-accreditation.html	C544
Wisconsin DNR	http://dnr.wi.gov/	998386840
Wyoming (EPA Region 8)	http://www.epa.gov/region8/water/dwhome/wyomingdi.html	-
Kelso Laboratory Website	www.alsglobal.com	NA

Analyses were performed according to our laboratory's NELAP-approved quality assurance program. A complete listing of specific NELAP-certified analytes, can be found in the certification section at www.ALSGlobal.com or at the accreditation bodies web site.

Please refer to the certification and/or accreditation body's web site if samples are submitted for compliance purposes. The states highlighted above, require the analysis be listed on the state certification if used for compliance purposes and if the method/analyte is offered by that state.

ALS ENVIRONMENTAL

Client: Golder Associates, Incorporated
Project: BDC Properties/ 13399732
Sample Matrix: Sediment

Service Request No.: K1409353
Date Received: 09/03/14

Case Narrative

All analyses were performed consistent with the quality assurance program of ALS Environmental. This report contains analytical results for samples designated for Tier II data deliverables. When appropriate to the method, method blank results have been reported with each analytical test. Surrogate recoveries have been reported for all applicable organic analyses. Additional quality control analyses reported herein include: Laboratory Duplicate (DUP), Matrix Spike (MS), Matrix/Duplicate Matrix Spike (MS/DMS), Laboratory Control Sample (LCS), and Laboratory/Duplicate Laboratory Control Sample (LCS/DLCS).

Sample Receipt

Fifteen sediment samples were received for analysis at ALS Environmental on 09/03/14. The samples were received in good condition and consistent with the accompanying chain of custody form. The samples were stored in a refrigerator at 4°C upon receipt at the laboratory.

Total Metals

Matrix Spike Recovery Exceptions:

The matrix spike recoveries of Barium, Lead, and Nickel for sample Comp 1 were outside the ALS control criteria as a result of the heterogeneous character of the sample. The Relative Percent Difference (RPD) for the replicate analysis supported this. The variability between replicates was sufficient to bias the percent recoveries outside normal ALS control criteria. The associated QA/QC results (e.g. control sample, calibration standards, etc.) indicated the analysis was in control. No further corrective action was appropriate.

Relative Percent Difference Exceptions:

The Relative Percent Difference (RPD) for the replicate analysis of Barium, Lead, Nickel and Zinc in sample Comp 1 was outside the normal ALS control limits. The variability in the results was attributed to the heterogeneous character of the sample. Standard mixing techniques were used, but were not sufficient for complete homogenization of this sample.

No other anomalies associated with the analysis of these samples were observed.

PCB Aroclors by EPA Method 8082

Calibration Verification Exceptions:

The analysis of PCB Aroclors by EPA 8082A requires the use of dual column confirmation. When the Continuing Calibration Verification (CCV) criterion is met for both columns, the lower of the two sample results is generally reported. The primary evaluation criteria were not met on the confirmation column for Aroclor 1016 in CCVs 0916F119, 0916F131, 0916F137, 0918F003, and 0918F011. The results for the associated target Aroclors were reported from the column with an acceptable CCV. The data quality was not affected. No further corrective action was necessary.

Approved by _____



Sample Confirmation Notes:

The confirmation comparison criterion of 40% difference was exceeded for Aroclor 1260 in sample CB-1. The lower of the two values was reported when there was an apparent interference on the alternate column that produced the higher value.

Elevated Detection Limits:

The detection limit was elevated for Aroclors 1260, 1262, and 1268 in samples CB-3 and CB-4; and for Aroclor 1268 in samples CB-7, CB-8, and CB-9. The chromatogram indicated the presence of non-target background components. The matrix interference prevented adequate resolution of the target compounds at the normal limit. The results were flagged to indicate the matrix interference.

Sample Notes and Discussion:

The samples in this data set appear to have been subjected to environmental stresses such as weathering, causing pattern degradation and changing the peak ratios. When pattern degradation occurs, correct identification and quantitative analysis of the individual Aroclors can be subjective. Care was taken to report the Aroclor(s) with the best pattern match.

Multiple Aroclors were identified in several field samples: Aroclor 1242, Aroclor 1254, Aroclor 1260, and/or Aroclor 1268. When mixtures of PCB Aroclors are present in a sample, correct identification and quantitative analysis of the individual Aroclors can be subjective. In particular, when mixtures are present, differentiating Aroclor 1242 from Aroclor 1248 can be difficult.

A review of several sample chromatograms indicated the presence of PCB patterns or matrix components that spanned the entire elution range from Aroclor 1242 through the end of Aroclor 1268. Based on individual PCB peaks in the early portion of the chromatogram, Aroclor 1242 was identified and quantitated. Although the presence of Aroclor 1248 could not be ruled out, Aroclor 1242 appeared to be the best match based on the early eluting peaks in the PCB chromatogram. Aroclors 1254, 1260, and/or 1268 were identified based on the presence of later eluting PCB peaks in the chromatogram.

When Aroclor mixtures are present in a sample, care is taken to minimize the possibility of double-counting PCBs. Analytical peaks are selected based on the best resolution possible for that particular sample. However, when a mixture of Aroclors 1242, 1254, 1260, and/or 1268 is present in a sample, the potential exists for a high bias from contribution of one Aroclor to another due to common peaks or peaks that cannot be completely resolved.

No other anomalies associated with the analysis of these samples were observed.

Polynuclear Aromatic Hydrocarbons by EPA Method 8270**Sample Notes and Discussion:**

The result reported for Chrysene in sample CB-3 may contain a slight bias. The chromatogram indicated the presence of non-target background components. The matrix interference may have resulted in a slight high bias in the affected samples. The results were flagged with "X" to indicate the issue.

The results reported for Chrysene, Benzo(b)fluoranthene, and Benzo(k)fluoranthene in sample CB-4 may contain a slight bias. The chromatogram indicated the presence of non-target background components. The matrix interference may have resulted in a slight high bias in the affected samples. The results were flagged with "X" to indicate the issue.

No other anomalies associated with the analysis of these samples were observed.

Approved by _____





CHAIN OF CUSTODY

52360

001

1317 South 13th Ave, Kelso, WA 98626 Phone (360) 577-7222 / 800-695-7222 / FAX (360) 636-1068

www.alsglobal.com

SR# K1409353

COC Set _____ of _____

COC# _____

Page 1 of 1

Project Name BDC Properties		Project Number 13399732		NUMBER OF CONTAINERS	14D 8082A / PCB	28D 8270D / PAH SIM	180D 7471B / Hg	999D 6010C / Metals T	160.3 Modified / TS	1	2	3	4	5	Remarks
Project Manager Audrey Herschberger															
Company Golder Associates															
Address 9 Monroe Pkwy Ste 270, Lake Oswego OR 97035															
Phone # 503-607-0830		email aherschberger@golder.com													
Sampler Signature Audrey Herschberger		Sampler Printed Name Audrey Herschberger													
CLIENT SAMPLE ID	LABID	SAMPLING Date Time	Matrix												
1. Comp 1	1315	9/2/14	S	1	X	X	X								
2. Comp 2	1235	9/2/14	S	1	X	X	X								
3. Comp 3		9/2/14	S	1	X	X	X								
4. Comp 4	1055	9/2/14	S	1	X	X	X								
5. Comp 5	1140	9/2/14	S	1	X	X	X								
6. CB-1	1315	9/2/14	S	1	X										
7. CB-2	1250	9/2/14	S	1	X										
8. CB-3	1225	9/2/14	S	1	X	X	X	X							
9. CB-4	1225	9/2/14	S	1	X	X	X	X							
10. CB-5	1315	9/2/14	S	1	X										

Report Requirements

- ☐ I. Routine Report: Method Blank, Surrogate, as required
- ☒ II. Report Dup., MS, MSD as required
- ☐ III. CLP Like Summary (no raw data)
- ☐ IV. Data Validation Report
- ☐ V. EDD

Invoice Information

P.O.# _____

Bill To: _____

Turnaround Requirements

☐ 24 hr. ☐ 48 hr.

☒ 5 Day Standard

Requested Report Date _____

Circle which metals are to be analyzed

Total Metals: Al (As) Sb (Ba) Be B Ca (Cd) Co (Cr) Cu Fe (Pb) Mg Mn Mo Ni K (Ag) Na (Se) Sr Ti Sn V Zn (Hg)

Dissolved Metals: Al As Sb Ba Be B Ca Cd Co Cr Cu Fe Pb Mg Mn Mo Ni K Ag Na Se Sr Ti Sn V Zn Hg

Special Instructions/Comments:

*Indicate State Hydrocarbon Procedure: AK CA WI Northwest Other _____ (Circle One)

Relinquished By:		Received By:		Relinquished By:		Received By:		Relinquished By:		Received By:	
Signature Audrey Herschberger		Signature ALS		Signature ALS		Signature ALS		Signature		Signature	
Printed Name Audrey Herschberger		Printed Name ALS		Printed Name ALS		Printed Name ALS		Printed Name		Printed Name	
Firm Golder 10:45		Firm 934 10:45		Firm		Firm 9/3/14 1300		Firm		Firm	
Date/Time		Date/Time		Date/Time		Date/Time		Date/Time		Date/Time	



52360

SR# 2104363

COC#

Page 1 of 1

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[illegible]


Invoice Information

P.O.#

Bill To:

Turnaround Requirements

_____ 24 hr. _____ 48 hr.

 5 Day Standard

Requested Report Date

Circle which metals are to be analyzed

Total Metals: Al As Sb Ba Be B Ca Cd Co Cr Cu Fe Pb Mg Mn Mo Ni K Ag Na Se Sr Tl Sn V Zn Hg

Dissolved Metals: Al As Sb Ba Be B Ca Cd Co Cr Cu Fe Pb Mg Mn Mo Ni K Ag Na Se Sr Tl Sn V Zn Hg

Special Instructions/Comments:

*Indicate State Hydrocarbon Procedure: AK CA WI Northwest Other (Circle One)

Relinquished By:	Received By:	Relinquished By:	Received By:	Relinquished By:	Received By:
Signature <i>[Signature]</i>	Signature <i>[Signature]</i>	Signature	Signature <i>[Signature]</i>	Signature	Signature
Printed Name Audrey Herschberger	Printed Name AS	Printed Name	Printed Name A25	Printed Name	Printed Name
Firm Golder 10:45	Firm 9314 10:45	Firm	Firm 9/3/14 1300	Firm	Firm
Date/Time	Date/Time	Date/Time	Date/Time	Date/Time	Date/Time

PC Lisa

Cooler Receipt and Preservation Form

Client / Project: Golder + Assoc. Service Request K14 09353
Received: 9/3/14 Opened: 9/3/14 By: [Signature] Unloaded: 9/3/14 By: [Signature]

1. Samples were received via? Mail Fed Ex UPS DHL PDX Courier Hand Delivered
2. Samples were received in: (circle) Cooler Box Envelope Other NA
3. Were custody seals on coolers? NA Y N If yes, how many and where? 2, front
If present, were custody seals intact? Y N If present, were they signed and dated? Y N

Raw Cooler Temp	Corrected Cooler Temp	Raw Temp Blank	Corrected Temp Blank	Corr. Factor	Thermometer ID	Cooler/COC ID	Tracking Number	NA	Filed
<u>1.4</u>	<u>1.6</u>	<u>7.3</u>	<u>7.5</u>	<u>+0.2</u>	<u>308</u>	<u>NA</u>		<u>NA</u>	

4. Packing material: Inserts Baggies Bubble Wrap Gel Packs Wet Ice Dry Ice Sleeves
5. Were custody papers properly filled out (ink, signed, etc.)? NA Y N
6. Did all bottles arrive in good condition (unbroken)? *Indicate in the table below.* NA Y N
7. Were all sample labels complete (i.e analysis, preservation, etc.)? NA Y N
8. Did all sample labels and tags agree with custody papers? *Indicate major discrepancies in the table on page 2.* NA Y N
9. Were appropriate bottles/containers and volumes received for the tests indicated? NA Y N
10. Were the pH-preserved bottles (*see SMO GEN SOP*) received at the appropriate pH? *Indicate in the table below* NA Y N
11. Were VOA vials received without headspace? *Indicate in the table below.* NA Y N
12. Was C12/Res negative? NA Y N

Sample ID on Bottle	Sample ID on COC	Identified by:

Sample ID	Bottle Count Bottle Type	Out of Temp	Head- space	Broke	pH	Reagent	Volume added	Reagent Lot Number	Initials	Time

Notes, Discrepancies, & Resolutions: _____

Analytical Report

Client: Golder Associates, Incorporated
Project: BDC Properties/13399732
Sample Matrix: Sediment
Analysis Method: 160.3 Modified
Prep Method: None

Service Request: K1409353
Date Collected: 09/2/14
Date Received: 09/3/14
Units: Percent
Basis: As Received

Solids, Total

Sample Name	Lab Code	Result	MRL	MDL	Dil.	Date Analyzed	Q
Comp 1	K1409353-001	55.9	-	-	1	09/04/14 10:09	
Comp 2	K1409353-002	50.5	-	-	1	09/04/14 10:09	
Comp 4	K1409353-003	43.6	-	-	1	09/04/14 10:09	
Comp 5	K1409353-004	47.0	-	-	1	09/04/14 10:09	
CB-1	K1409353-005	64.4	-	-	1	09/04/14 10:09	
CB-2	K1409353-006	53.7	-	-	1	09/04/14 10:09	
CB-3	K1409353-007	49.1	-	-	1	09/04/14 10:09	
CB-4	K1409353-008	41.7	-	-	1	09/04/14 10:09	
CB-5	K1409353-009	51.0	-	-	1	09/04/14 10:09	
CB-6	K1409353-010	44.2	-	-	1	09/04/14 10:09	
CB-7	K1409353-011	49.4	-	-	1	09/04/14 10:09	
CB-8	K1409353-012	37.7	-	-	1	09/04/14 10:09	
CB-9	K1409353-013	31.4	-	-	1	09/04/14 10:09	
CB-10	K1409353-014	59.0	-	-	1	09/04/14 10:09	
Duplicate	K1409353-015	54.5	-	-	1	09/04/14 10:09	

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QA/QC Report

Client: Golder Associates, Incorporated
Project BDC Properties/13399732
Sample Matrix: Sediment

Service Request: K1409353**Date Collected:** 09/02/14**Date Received:** 09/03/14**Date Analyzed:** 09/04/14

Replicate Sample Summary
General Chemistry Parameters

Sample Name: Comp 1
Lab Code: K1409353-001

Units: Percent**Basis:** As Received

					Duplicate Sample K1409353- 001DUP			
Analyte Name	Analysis Method	MRL	MDL	Sample Result	Result	Average	RPD	RPD Limit
Solids, Total	160.3 Modified	-	-	55.9	56.4	56.2	<1	20

Results flagged with an asterisk (*) indicate values outside control criteria.

Results flagged with a pound (#) indicate the control criteria is not applicable.

Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

Metals
- 1 -
INORGANIC ANALYSIS DATA PACKAGE

Client: Golder Associates, Incorporated **Service Request:** K1409353
Project No.: 13399732 **Date Collected:** 09/02/14
Project Name: BDC Properties **Date Received:** 09/03/14
Matrix: SEDIMENT **Units:** mg/Kg
Basis: DRY

Sample Name: Comp 1 **Lab Code:** K1409353-001

Analyte	Analysis Method	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Result	C	Q
Arsenic	6010C	4.0	0.8	2.0	09/08/14	09/09/14	11.4		
Barium	6010C	0.80	0.30	2.0	09/08/14	09/09/14	439		N*
Cadmium	6010C	0.20	0.02	2.0	09/08/14	09/09/14	1.00		*
Chromium	6010C	0.8	0.1	2.0	09/08/14	09/09/14	265		
Copper	6010C	0.8	0.3	2.0	09/08/14	09/09/14	544		
Lead	6010C	2.0	0.4	2.0	09/08/14	09/09/14	53.7		N*
Manganese	6010C	0.20	0.02	2.0	09/08/14	09/09/14	725		
Mercury	7471B	0.020	0.002	1.0	09/05/14	09/05/14	0.056		
Nickel	6010C	0.80	0.10	2.0	09/08/14	09/09/14	279		N*
Selenium	6010C	4.0	0.9	2.0	09/08/14	09/09/14	0.9	U	
Silver	6010C	0.8	0.2	2.0	09/08/14	09/09/14	0.4	J	
Zinc	6010C	1.0	0.2	2.0	09/08/14	09/09/14	2230		*

% Solids: 55.9

Comments:

Client:	Golder Associates, Incorporated	Service Request:	K1409353
Project No.:	13399732	Date Collected:	09/02/14
Project Name:	BDC Properties	Date Received:	09/03/14
Matrix:	SEDIMENT	Units:	mg/Kg
		Basis:	DRY

Sample Name: Comp 2 Lab Code: K1409353-002

Analyte	Analysis Method	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Result	C	Q
Arsenic	6010C	3.8	0.8	2.0	09/08/14	09/09/14	9.2		
Barium	6010C	0.75	0.28	2.0	09/08/14	09/09/14	519		N*
Cadmium	6010C	0.19	0.02	2.0	09/08/14	09/09/14	2.00		*
Chromium	6010C	0.8	0.1	2.0	09/08/14	09/09/14	154		
Copper	6010C	0.75	0.19	2.0	09/08/14	09/09/14	315		
Lead	6010C	1.9	0.4	2.0	09/08/14	09/09/14	156		N*
Manganese	6010C	0.19	0.02	2.0	09/08/14	09/09/14	583		
Mercury	7471B	0.024	0.002	1.0	09/05/14	09/05/14	0.113		
Nickel	6010C	0.75	0.09	2.0	09/08/14	09/09/14	97.3		N*
Selenium	6010C	3.8	0.8	2.0	09/08/14	09/09/14	0.8	U	
Silver	6010C	0.8	0.2	2.0	09/08/14	09/09/14	0.4	J	
Zinc	6010C	0.9	0.2	2.0	09/08/14	09/09/14	2010		*

% Solids: 50.5

Comments:

Metals
- 1 -
INORGANIC ANALYSIS DATA PACKAGE

Client: Golder Associates, Incorporated **Service Request:** K1409353
Project No.: 13399732 **Date Collected:** 09/02/14
Project Name: BDC Properties **Date Received:** 09/03/14
Matrix: SEDIMENT **Units:** mg/Kg
Basis: DRY

Sample Name: Comp 4 **Lab Code:** K1409353-003

Analyte	Analysis Method	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Result	C	Q
Arsenic	6010C	4.0	0.8	2.0	09/08/14	09/09/14	4.2		
Barium	6010C	0.79	0.30	2.0	09/08/14	09/09/14	246		N*
Cadmium	6010C	0.20	0.02	2.0	09/08/14	09/09/14	1.40		* J+
Chromium	6010C	0.8	0.1	2.0	09/08/14	09/09/14	107		
Copper	6010C	0.8	0.3	2.0	09/08/14	09/09/14	212		
Lead	6010C	2.0	0.4	2.0	09/08/14	09/09/14	69.9		N*
Manganese	6010C	0.20	0.02	2.0	09/08/14	09/09/14	315		
Mercury	7471B	0.029	0.003	1.0	09/05/14	09/05/14	0.111		
Nickel	6010C	0.79	0.10	2.0	09/08/14	09/09/14	55.5		N*
Selenium	6010C	4.0	0.9	2.0	09/08/14	09/09/14	0.9	U	
Silver	6010C	0.8	0.2	2.0	09/08/14	09/09/14	0.6	J	
Zinc	6010C	1.0	0.2	2.0	09/08/14	09/09/14	1110		*

% Solids: 43.6

Comments:

Metals
- 1 -
INORGANIC ANALYSIS DATA PACKAGE

Client: Golder Associates, Incorporated **Service Request:** K1409353
Project No.: 13399732 **Date Collected:** 09/02/14
Project Name: BDC Properties **Date Received:** 09/03/14
Matrix: SEDIMENT **Units:** mg/Kg
Basis: DRY

Sample Name: Comp 5 **Lab Code:** K1409353-004

Analyte	Analysis Method	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Result	C	Q
Arsenic	6010C	3.9	0.8	2.0	09/08/14	09/09/14	7.7		
Barium	6010C	0.78	0.29	2.0	09/08/14	09/09/14	240		N*
Cadmium	6010C	0.19	0.02	2.0	09/08/14	09/09/14	1.32		*
Chromium	6010C	0.8	0.1	2.0	09/08/14	09/09/14	67.4		
Copper	6010C	0.8	0.3	2.0	09/08/14	09/09/14	296		
Lead	6010C	1.9	0.4	2.0	09/08/14	09/09/14	196		N*
Manganese	6010C	0.19	0.02	2.0	09/08/14	09/09/14	304		
Mercury	7471B	0.024	0.002	1.0	09/05/14	09/05/14	0.148		
Nickel	6010C	0.78	0.10	2.0	09/08/14	09/09/14	44.8		N*
Selenium	6010C	3.9	0.9	2.0	09/08/14	09/09/14	0.9	J	
Silver	6010C	0.8	0.2	2.0	09/08/14	09/09/14	1.1		
Zinc	6010C	1.0	0.2	2.0	09/08/14	09/09/14	661		*

% Solids: 47.0

Comments:

Metals
- 1 -
INORGANIC ANALYSIS DATA PACKAGE

Client: Golder Associates, Incorporated **Service Request:** K1409353
Project No.: 13399732 **Date Collected:** 09/02/14
Project Name: BDC Properties **Date Received:** 09/03/14
Matrix: SEDIMENT **Units:** mg/Kg
Basis: DRY

Sample Name: CB-3 **Lab Code:** K1409353-007

Analyte	Analysis Method	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Result	C	Q
Arsenic	6010C	3.9	0.8	2.0	09/08/14	09/09/14	16.4		
Barium	6010C	0.77	0.29	2.0	09/08/14	09/09/14	230		N*
Cadmium	6010C	0.19	0.02	2.0	09/08/14	09/09/14	1.25		*
Chromium	6010C	0.8	0.1	2.0	09/08/14	09/09/14	148		
Copper	6010C	0.8	0.3	2.0	09/08/14	09/09/14	247		
Lead	6010C	1.9	0.4	2.0	09/08/14	09/09/14	81.2		N*
Manganese	6010C	0.19	0.02	2.0	09/08/14	09/09/14	245		
Mercury	7471B	0.026	0.003	1.0	09/05/14	09/05/14	0.136		
Nickel	6010C	0.77	0.10	2.0	09/08/14	09/09/14	77.3		N*
Selenium	6010C	3.9	0.9	2.0	09/08/14	09/09/14	0.9	U	
Silver	6010C	0.8	0.2	2.0	09/08/14	09/09/14	0.7	J	
Zinc	6010C	1.0	0.2	2.0	09/08/14	09/09/14	920		*

% Solids: 49.1

Comments:

Metals
- 1 -
INORGANIC ANALYSIS DATA PACKAGE

Client: Golder Associates, Incorporated **Service Request:** K1409353
Project No.: 13399732 **Date Collected:** 09/02/14
Project Name: BDC Properties **Date Received:** 09/03/14
Matrix: SEDIMENT **Units:** mg/Kg
Basis: DRY

Sample Name: CB-4 **Lab Code:** K1409353-008

Analyte	Analysis Method	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Result	C	Q
Arsenic	6010C	3.6	0.7	2.0	09/08/14	09/09/14	5.6		
Barium	6010C	0.72	0.27	2.0	09/08/14	09/09/14	447		N*
Cadmium	6010C	0.18	0.02	2.0	09/08/14	09/09/14	6.66		*
Chromium	6010C	0.7	0.1	2.0	09/08/14	09/09/14	301		
Copper	6010C	0.7	0.3	2.0	09/08/14	09/09/14	359		
Lead	6010C	1.8	0.4	2.0	09/08/14	09/09/14	247		N*
Manganese	6010C	0.18	0.02	2.0	09/08/14	09/09/14	392		
Mercury	7471B	0.027	0.003	1.0	09/05/14	09/05/14	0.251		
Nickel	6010C	0.72	0.09	2.0	09/08/14	09/09/14	174		N*
Selenium	6010C	3.6	0.8	2.0	09/08/14	09/09/14	0.8	U	
Silver	6010C	0.7	0.2	2.0	09/08/14	09/09/14	1.0		
Zinc	6010C	0.9	0.2	2.0	09/08/14	09/09/14	1580		*

% Solids: 41.7

Comments:

Metals
- 1 -
INORGANIC ANALYSIS DATA PACKAGE

Client: Golder Associates, Incorporated **Service Request:** K1409353
Project No.: 13399732 **Date Collected:** 09/02/14
Project Name: BDC Properties **Date Received:** 09/03/14
Matrix: SEDIMENT **Units:** mg/Kg
Basis: DRY

Sample Name: Duplicate **Lab Code:** K1409353-015

Analyte	Analysis Method	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Result	C	Q
Arsenic	6010C	3.7	0.7	2.0	09/08/14	09/09/14	6.9		
Barium	6010C	0.74	0.28	2.0	09/08/14	09/09/14	291		N*
Cadmium	6010C	0.19	0.02	2.0	09/08/14	09/09/14	1.48		*
Chromium	6010C	0.7	0.1	2.0	09/08/14	09/09/14	101		
Copper	6010C	0.7	0.3	2.0	09/08/14	09/09/14	190		
Lead	6010C	1.9	0.4	2.0	09/08/14	09/09/14	158		N*
Manganese	6010C	0.19	0.02	2.0	09/08/14	09/09/14	485		
Mercury	7471B	0.024	0.002	1.0	09/05/14	09/05/14	0.121		
Nickel	6010C	0.74	0.09	2.0	09/08/14	09/09/14	62.0		N*
Selenium	6010C	3.7	0.8	2.0	09/08/14	09/09/14	0.8	U	
Silver	6010C	0.7	0.2	2.0	09/08/14	09/09/14	0.2	J	
Zinc	6010C	0.9	0.2	2.0	09/08/14	09/09/14	1130		*

% Solids: 54.5

Comments:

Metals
- 1 -
INORGANIC ANALYSIS DATA PACKAGE

Client:	Golder Associates, Incorporated	Service Request:	K1409353
Project No.:	13399732	Date Collected:	
Project Name:	BDC Properties	Date Received:	
Matrix:	SEDIMENT	Units:	mg/Kg
		Basis:	DRY

Sample Name: Method Blank Lab Code: K1409353-MB

Analyte	Analysis Method	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Result	C	Q
Arsenic	6010C	4.0	0.8	2.0	09/08/14	09/09/14	0.8	U	
Barium	6010C	0.80	0.30	2.0	09/08/14	09/09/14	0.56	J	N*
Cadmium	6010C	0.20	0.02	2.0	09/08/14	09/09/14	0.02	J	*
Chromium	6010C	0.8	0.1	2.0	09/08/14	09/09/14	0.1	U	
Copper	6010C	0.8	0.3	2.0	09/08/14	09/09/14	0.3	U	
Lead	6010C	2.0	0.4	2.0	09/08/14	09/09/14	0.4	U	N*
Manganese	6010C	0.20	0.02	2.0	09/08/14	09/09/14	0.10	J	
Mercury	7471B	0.018	0.002	1.0	09/05/14	09/05/14	0.002	U	
Nickel	6010C	0.80	0.10	2.0	09/08/14	09/09/14	0.10	U	N*
Selenium	6010C	4.0	0.9	2.0	09/08/14	09/09/14	0.9	U	
Silver	6010C	0.8	0.2	2.0	09/08/14	09/09/14	0.2	U	
Zinc	6010C	1.0	0.2	2.0	09/08/14	09/09/14	0.2	J	*

% Solids: 0.0

Comments:

Metals

- 5A -

SPIKE SAMPLE RECOVERY

Client: Golder Associates, Incorporated **Service Request:** K1409353
Project No.: 13399732 **Units:** MG/KG
Project Name: BDC Properties **Basis:** DRY
Matrix: SEDIMENT **% Solids:** 55.9

Sample Name: Comp 1S

Lab Code: K1409353-001S

Analyte	Control Limit %R	Spike Result	C	Sample Result	C	Spike Added	%R	Q	Method
Arsenic	75 - 125	104		11.4		94.65	97.8		6010C
Barium	75 - 125	561		439		189.30	64.4	N	6010C
Cadmium	75 - 125	9.67		1.00		9.47	91.6		6010C
Chromium		345		265		37.86	211.3		6010C
Copper		562		544		47.33	38.0		6010C
Lead	75 - 125	208		53.7		94.65	163.0	N	6010C
Manganese		895		725		94.65	179.6		6010C
Mercury	80 - 120	0.561		0.056		0.49	103.1		7471B
Nickel	75 - 125	550		279		94.65	286.3	N	6010C
Selenium	75 - 125	81.4		0.9	U	94.65	86.0		6010C
Silver	75 - 125	9.5		0.4	J	9.47	96.1		6010C
Zinc		2330		2230		94.65	105.7		6010C

An empty field in the Control Limit column indicates the control limit is not applicable

Metals

- 5A -

SPIKE SAMPLE RECOVERY

Client: Golder Associates, Incorporated **Service Request:** K1409353
Project No.: 13399732 **Units:** MG/KG
Project Name: BDC Properties **Basis:** DRY
Matrix: SEDIMENT **% Solids:** 55.9

Sample Name: Comp 1SD

Lab Code: K1409353-001SD

Analyte	Control Limit %R	Spike Result	C	Sample Result	C	Spike Added	%R	Q	Method
Arsenic	75 - 125	103		11.4		93.17	98.3		6010C
Barium	75 - 125	538		439		186.34	53.1	N	6010C
Cadmium	75 - 125	9.67		1.00		9.32	93.0		6010C
Chromium		351		265		37.27	230.7		6010C
Copper		593		544		46.59	105.2		6010C
Lead	75 - 125	142		53.7		93.17	94.8		6010C
Manganese		873		725		93.17	158.8		6010C
Nickel		470		279		93.17	205.0	N	6010C
Selenium	75 - 125	79.9		0.9	U	93.17	85.8		6010C
Silver	75 - 125	9.4		0.4	J	9.32	96.6		6010C
Zinc		3350		2230		93.17	1202.1		6010C

An empty field in the Control Limit column indicates the control limit is not applicable

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Metals**- 6 -****DUPLICATES**

Client: Golder Associates, Incorporated **Service Request:** K1409353
Project No.: 13399732 **Units:** MG/KG
Project Name: BDC Properties **Basis:** DRY
Matrix: SEDIMENT **% Solids:** 55.9

Sample Name: Comp 1D**Lab Code:** K1409353-001D

Analyte	Control Limit	Sample (S)	C	Duplicate (D)	C	RPD	Q	Method
Arsenic		11.4		10.2		11.1		6010C
Barium	20	439		547		21.9	*	6010C
Cadmium		1.00		0.75		28.6	*	6010C
Chromium	20	265		254		4.2		6010C
Copper	20	544		484		11.7		6010C
Lead	20	53.7		45.5		16.5		6010C
Manganese	20	725		715		1.4		6010C
Mercury		0.056		0.051		9.3		7471B
Nickel	20	279		362		25.9	*	6010C
Selenium		0.9	U	0.9	U			6010C
Silver		0.4	J	0.2	J	66.7		6010C
Zinc	20	2230		1960		12.9		6010C

An empty field in the Control Limit column indicates the control limit is not applicable.

ALS Group USA, Corp.

dba ALS Environmental

Metals**- 6 -****DUPLICATES**

Client: Golder Associates, Incorporated **Service Request:** K1409353
Project No.: 13399732 **Units:** MG/KG
Project Name: BDC Properties **Basis:** DRY
Matrix: SEDIMENT **% Solids:** 55.9

Sample Name: Comp 1SD**Lab Code:** K1409353-001SD

Analyte	Control Limit	Sample (S)	C	Duplicate (D)	C	RPD	Q	Method
Arsenic	20	104		103		1.0		6010C
Barium	20	561		538		4.2		6010C
Cadmium	20	9.67		9.67		0.0		6010C
Chromium	20	345		351		1.7		6010C
Copper	20	562		593		5.4		6010C
Lead	20	208		142		37.7	*	6010C
Manganese	20	895		873		2.5		6010C
Nickel	20	550		470		15.7		6010C
Selenium	20	81.4		79.9		1.9		6010C
Silver	20	9.5		9.4		1.1		6010C
Zinc	20	2330		3350		35.9	*	6010C

An empty field in the Control Limit column indicates the control limit is not applicable.

Metals

- 7 -

LABORATORY CONTROL SAMPLE

Client: Golder Associates, Incorporated

Service Request: K1409353

Project No.: 13399732

Project Name: BDC Properties

Aqueous LCS Source:

Solid LCS Source: ERA D080-540

Analyte	Aqueous (ug/L)			Solid (mg/kg)					
	True	Found	%R	True	Found	C	Limits	%R	
Arsenic				99.6	105		69	131	105.4
Barium				310	294		74	126	94.8
Cadmium				182	180		74	126	98.9
Chromium				136	139		70	130	102.2
Copper				102	110		74	126	107.8
Lead				115	106		72	129	92.2
Manganese				323	320		75	125	99.1
Mercury				19.9	22.3		51	148	112.1
Nickel				153	153		73	126	100.0
Selenium				150	148		67	133	98.7
Silver				40.4	40.4		66	134	100.0
Zinc				161	153		81	119	95.0

Analytical Results

Client: Golder Associates, Incorporated
Project: BDC Properties/13399732
Sample Matrix: Sediment

Service Request: K1409353
Date Collected: 09/02/2014
Date Received: 09/03/2014

Polychlorinated Biphenyls (PCBs)

Sample Name: CB-1
Lab Code: K1409353-005
Extraction Method: EPA 3541
Analysis Method: 8082A

Units: mg/Kg
Basis: Dry
Level: Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Aroclor 1016	ND	U	0.078	0.0085	1	09/09/14	09/17/14	KWG1412565	
Aroclor 1221	ND	U	0.16	0.0085	1	09/09/14	09/17/14	KWG1412565	
Aroclor 1232	ND	U	0.078	0.0085	1	09/09/14	09/17/14	KWG1412565	
Aroclor 1242	0.023	J	0.078	0.0085	1	09/09/14	09/17/14	KWG1412565	
Aroclor 1248	ND	U	0.078	0.0085	1	09/09/14	09/17/14	KWG1412565	
Aroclor 1254	0.10		0.078	0.0085	1	09/09/14	09/17/14	KWG1412565	
Aroclor 1260	0.078	P J	0.078	0.0085	1	09/09/14	09/17/14	KWG1412565	
Aroclor 1262	ND	U	0.078	0.0085	1	09/09/14	09/17/14	KWG1412565	
Aroclor 1268	0.029	J	0.078	0.0085	1	09/09/14	09/17/14	KWG1412565	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
Decachlorobiphenyl	76	43-148	09/17/14	Acceptable

Comments: _____

Analytical Results

Client: Golder Associates, Incorporated
Project: BDC Properties/13399732
Sample Matrix: Sediment

Service Request: K1409353
Date Collected: 09/02/2014
Date Received: 09/03/2014

Polychlorinated Biphenyls (PCBs)

Sample Name: CB-2
Lab Code: K1409353-006
Extraction Method: EPA 3541
Analysis Method: 8082A

Units: mg/Kg
Basis: Dry
Level: Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Aroclor 1016	ND	U	0.093	0.0085	1	09/09/14	09/17/14	KWG1412565	
Aroclor 1221	ND	U	0.19	0.0085	1	09/09/14	09/17/14	KWG1412565	
Aroclor 1232	ND	U	0.093	0.0085	1	09/09/14	09/17/14	KWG1412565	
Aroclor 1242	0.041	J	0.093	0.0085	1	09/09/14	09/17/14	KWG1412565	
Aroclor 1248	ND	U	0.093	0.0085	1	09/09/14	09/17/14	KWG1412565	
Aroclor 1254	0.20		0.093	0.0085	1	09/09/14	09/17/14	KWG1412565	
Aroclor 1260	0.15		0.093	0.0085	1	09/09/14	09/17/14	KWG1412565	
Aroclor 1262	ND	U	0.093	0.0085	1	09/09/14	09/17/14	KWG1412565	
Aroclor 1268	0.044	J	0.093	0.0085	1	09/09/14	09/17/14	KWG1412565	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
Decachlorobiphenyl	89	43-148	09/17/14	Acceptable

Comments: _____

Analytical Results

Client: Golder Associates, Incorporated
Project: BDC Properties/13399732
Sample Matrix: Sediment

Service Request: K1409353
Date Collected: 09/02/2014
Date Received: 09/03/2014

Polychlorinated Biphenyls (PCBs)

Sample Name: CB-3
Lab Code: K1409353-007
Extraction Method: EPA 3541
Analysis Method: 8082A

Units: mg/Kg
Basis: Dry
Level: Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Aroclor 1016	ND	U	0.11	0.0087	1	09/09/14	09/17/14	KWG1412565	
Aroclor 1221	ND	U	0.21	0.0087	1	09/09/14	09/17/14	KWG1412565	
Aroclor 1232	ND	U	0.11	0.0087	1	09/09/14	09/17/14	KWG1412565	
Aroclor 1242	0.053	J	0.11	0.0087	1	09/09/14	09/17/14	KWG1412565	
Aroclor 1248	ND	U	0.11	0.0087	1	09/09/14	09/17/14	KWG1412565	
Aroclor 1254	0.25		0.11	0.0087	1	09/09/14	09/17/14	KWG1412565	
Aroclor 1260	ND	Ui	0.11	0.057	1	09/09/14	09/17/14	KWG1412565	UU
Aroclor 1262	ND	Ui	0.11	0.048	1	09/09/14	09/17/14	KWG1412565	UU
Aroclor 1268	ND	Ui	0.11	0.033	1	09/09/14	09/17/14	KWG1412565	UU

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
Decachlorobiphenyl	74	43-148	09/17/14	Acceptable

Comments: _____

Analytical Results

Client: Golder Associates, Incorporated
Project: BDC Properties/13399732
Sample Matrix: Sediment

Service Request: K1409353
Date Collected: 09/02/2014
Date Received: 09/03/2014

Polychlorinated Biphenyls (PCBs)

Sample Name: CB-4
Lab Code: K1409353-008
Extraction Method: EPA 3541
Analysis Method: 8082A

Units: mg/Kg
Basis: Dry
Level: Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Aroclor 1016	ND	U	0.12	0.010	1	09/09/14	09/17/14	KWG1412565	
Aroclor 1221	ND	U	0.24	0.010	1	09/09/14	09/17/14	KWG1412565	
Aroclor 1232	ND	U	0.12	0.010	1	09/09/14	09/17/14	KWG1412565	
Aroclor 1242	0.041	JP	0.12	0.010	1	09/09/14	09/17/14	KWG1412565	J
Aroclor 1248	ND	U	0.12	0.010	1	09/09/14	09/17/14	KWG1412565	
Aroclor 1254	0.17		0.12	0.010	1	09/09/14	09/17/14	KWG1412565	
Aroclor 1260	ND	Ui	0.12	0.030	1	09/09/14	09/17/14	KWG1412565	UU
Aroclor 1262	ND	Ui	0.12	0.023	1	09/09/14	09/17/14	KWG1412565	UU
Aroclor 1268	ND	Ui	0.12	0.027	1	09/09/14	09/17/14	KWG1412565	UU

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
Decachlorobiphenyl	92	43-148	09/17/14	Acceptable

Comments: _____

Analytical Results

Client: Golder Associates, Incorporated
Project: BDC Properties/13399732
Sample Matrix: Sediment

Service Request: K1409353
Date Collected: 09/02/2014
Date Received: 09/03/2014

Polychlorinated Biphenyls (PCBs)

Sample Name: CB-5
Lab Code: K1409353-009
Extraction Method: EPA 3541
Analysis Method: 8082A

Units: mg/Kg
Basis: Dry
Level: Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Aroclor 1016	ND	U	0.098	0.0085	1	09/09/14	09/17/14	KWG1412565	
Aroclor 1221	ND	U	0.20	0.0085	1	09/09/14	09/17/14	KWG1412565	
Aroclor 1232	ND	U	0.098	0.0085	1	09/09/14	09/17/14	KWG1412565	
Aroclor 1242	0.030	J	0.098	0.0085	1	09/09/14	09/17/14	KWG1412565	
Aroclor 1248	ND	U	0.098	0.0085	1	09/09/14	09/17/14	KWG1412565	
Aroclor 1254	0.19		0.098	0.0085	1	09/09/14	09/17/14	KWG1412565	
Aroclor 1260	0.10		0.098	0.0085	1	09/09/14	09/17/14	KWG1412565	
Aroclor 1262	ND	U	0.098	0.0085	1	09/09/14	09/17/14	KWG1412565	
Aroclor 1268	0.031	J	0.098	0.0085	1	09/09/14	09/17/14	KWG1412565	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
Decachlorobiphenyl	76	43-148	09/17/14	Acceptable

Comments: _____

Analytical Results

Client: Golder Associates, Incorporated
Project: BDC Properties/13399732
Sample Matrix: Sediment

Service Request: K1409353
Date Collected: 09/02/2014
Date Received: 09/03/2014

Polychlorinated Biphenyls (PCBs)

Sample Name: CB-6
Lab Code: K1409353-010
Extraction Method: EPA 3541
Analysis Method: 8082A

Units: mg/Kg
Basis: Dry
Level: Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Aroclor 1016	ND	U	0.12	0.0097	1	09/09/14	09/18/14	KWG1412565	
Aroclor 1221	ND	U	0.23	0.0097	1	09/09/14	09/18/14	KWG1412565	
Aroclor 1232	ND	U	0.12	0.0097	1	09/09/14	09/18/14	KWG1412565	
Aroclor 1242	0.11	J	0.12	0.0097	1	09/09/14	09/18/14	KWG1412565	
Aroclor 1248	ND	U	0.12	0.0097	1	09/09/14	09/18/14	KWG1412565	
Aroclor 1254	0.25		0.12	0.0097	1	09/09/14	09/18/14	KWG1412565	
Aroclor 1260	0.14		0.12	0.0097	1	09/09/14	09/18/14	KWG1412565	
Aroclor 1262	ND	U	0.12	0.0097	1	09/09/14	09/18/14	KWG1412565	
Aroclor 1268	0.041	JP	0.12	0.0097	1	09/09/14	09/18/14	KWG1412565	J

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
Decachlorobiphenyl	83	43-148	09/18/14	Acceptable

Comments: _____

Analytical Results

Client: Golder Associates, Incorporated
Project: BDC Properties/13399732
Sample Matrix: Sediment

Service Request: K1409353
Date Collected: 09/02/2014
Date Received: 09/03/2014

Polychlorinated Biphenyls (PCBs)

Sample Name: CB-7
Lab Code: K1409353-011
Extraction Method: EPA 3541
Analysis Method: 8082A

Units: mg/Kg
Basis: Dry
Level: Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Aroclor 1016	ND	U	0.11	0.0086	1	09/09/14	09/17/14	KWG1412565	
Aroclor 1221	ND	U	0.21	0.0086	1	09/09/14	09/17/14	KWG1412565	
Aroclor 1232	ND	U	0.11	0.0086	1	09/09/14	09/17/14	KWG1412565	
Aroclor 1242	0.027	J	0.11	0.0086	1	09/09/14	09/17/14	KWG1412565	
Aroclor 1248	ND	U	0.11	0.0086	1	09/09/14	09/17/14	KWG1412565	
Aroclor 1254	0.19		0.11	0.0086	1	09/09/14	09/17/14	KWG1412565	
Aroclor 1260	0.054	J	0.11	0.0086	1	09/09/14	09/17/14	KWG1412565	
Aroclor 1262	ND	U	0.11	0.0086	1	09/09/14	09/17/14	KWG1412565	
Aroclor 1268	ND	U	0.11	0.014	1	09/09/14	09/17/14	KWG1412565	UU

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
Decachlorobiphenyl	85	43-148	09/17/14	Acceptable

Comments: _____

Analytical Results

Client: Golder Associates, Incorporated
Project: BDC Properties/13399732
Sample Matrix: Sediment

Service Request: K1409353
Date Collected: 09/02/2014
Date Received: 09/03/2014

Polychlorinated Biphenyls (PCBs)

Sample Name: CB-8
Lab Code: K1409353-012
Extraction Method: EPA 3541
Analysis Method: 8082A

Units: mg/Kg
Basis: Dry
Level: Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Aroclor 1016	ND	U	0.14	0.012	1	09/09/14	09/17/14	KWG1412565	
Aroclor 1221	ND	U	0.27	0.012	1	09/09/14	09/17/14	KWG1412565	
Aroclor 1232	ND	U	0.14	0.012	1	09/09/14	09/17/14	KWG1412565	
Aroclor 1242	0.072	J	0.14	0.012	1	09/09/14	09/17/14	KWG1412565	
Aroclor 1248	ND	U	0.14	0.012	1	09/09/14	09/17/14	KWG1412565	
Aroclor 1254	0.53		0.14	0.012	1	09/09/14	09/17/14	KWG1412565	
Aroclor 1260	0.10	JP	0.14	0.012	1	09/09/14	09/17/14	KWG1412565	J
Aroclor 1262	ND	U	0.14	0.012	1	09/09/14	09/17/14	KWG1412565	
Aroclor 1268	ND	Ui	0.14	0.019	1	09/09/14	09/17/14	KWG1412565	UU

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
Decachlorobiphenyl	82	43-148	09/17/14	Acceptable

Comments: _____

Analytical Results

Client: Golder Associates, Incorporated
Project: BDC Properties/13399732
Sample Matrix: Sediment

Service Request: K1409353
Date Collected: 09/02/2014
Date Received: 09/03/2014

Polychlorinated Biphenyls (PCBs)

Sample Name: CB-9
Lab Code: K1409353-013
Extraction Method: EPA 3541
Analysis Method: 8082A

Units: mg/Kg
Basis: Dry
Level: Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Aroclor 1016	ND	U	0.16	0.014	1	09/09/14	09/18/14	KWG1412565	
Aroclor 1221	ND	U	0.32	0.014	1	09/09/14	09/18/14	KWG1412565	
Aroclor 1232	ND	U	0.16	0.014	1	09/09/14	09/18/14	KWG1412565	
Aroclor 1242	0.049	J	0.16	0.014	1	09/09/14	09/18/14	KWG1412565	
Aroclor 1248	ND	U	0.16	0.014	1	09/09/14	09/18/14	KWG1412565	
Aroclor 1254	0.39		0.16	0.014	1	09/09/14	09/18/14	KWG1412565	
Aroclor 1260	0.090	JP	0.16	0.014	1	09/09/14	09/18/14	KWG1412565	J
Aroclor 1262	ND	U	0.16	0.014	1	09/09/14	09/18/14	KWG1412565	
Aroclor 1268	ND	Ui	0.16	0.019	1	09/09/14	09/18/14	KWG1412565	UU

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
Decachlorobiphenyl	109	43-148	09/18/14	Acceptable

Comments: _____

Analytical Results

Client: Golder Associates, Incorporated
Project: BDC Properties/13399732
Sample Matrix: Sediment

Service Request: K1409353
Date Collected: 09/02/2014
Date Received: 09/03/2014

Polychlorinated Biphenyls (PCBs)

Sample Name: CB-10
Lab Code: K1409353-014
Extraction Method: EPA 3541
Analysis Method: 8082A

Units: mg/Kg
Basis: Dry
Level: Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Aroclor 1016	ND	U	0.085	0.0085	1	09/09/14	09/17/14	KWG1412565	
Aroclor 1221	ND	U	0.17	0.0085	1	09/09/14	09/17/14	KWG1412565	
Aroclor 1232	ND	U	0.085	0.0085	1	09/09/14	09/17/14	KWG1412565	
Aroclor 1242	0.027	J	0.085	0.0085	1	09/09/14	09/17/14	KWG1412565	
Aroclor 1248	ND	U	0.085	0.0085	1	09/09/14	09/17/14	KWG1412565	
Aroclor 1254	0.20		0.085	0.0085	1	09/09/14	09/17/14	KWG1412565	
Aroclor 1260	0.066	J	0.085	0.0085	1	09/09/14	09/17/14	KWG1412565	
Aroclor 1262	ND	U	0.085	0.0085	1	09/09/14	09/17/14	KWG1412565	
Aroclor 1268	ND	U	0.085	0.0085	1	09/09/14	09/17/14	KWG1412565	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
Decachlorobiphenyl	79	43-148	09/17/14	Acceptable

Comments: _____

Analytical Results

Client: Golder Associates, Incorporated
Project: BDC Properties/13399732
Sample Matrix: Sediment

Service Request: K1409353
Date Collected: NA
Date Received: NA

Polychlorinated Biphenyls (PCBs)

Sample Name: Method Blank
Lab Code: KWG1412565-4
Extraction Method: EPA 3541
Analysis Method: 8082A

Units: mg/Kg
Basis: Dry
Level: Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Aroclor 1016	ND	U	0.050	0.0085	1	09/09/14	09/17/14	KWG1412565	
Aroclor 1221	ND	U	0.099	0.0085	1	09/09/14	09/17/14	KWG1412565	
Aroclor 1232	ND	U	0.050	0.0085	1	09/09/14	09/17/14	KWG1412565	
Aroclor 1242	ND	U	0.050	0.0085	1	09/09/14	09/17/14	KWG1412565	
Aroclor 1248	ND	U	0.050	0.0085	1	09/09/14	09/17/14	KWG1412565	
Aroclor 1254	ND	U	0.050	0.0085	1	09/09/14	09/17/14	KWG1412565	
Aroclor 1260	ND	U	0.050	0.0085	1	09/09/14	09/17/14	KWG1412565	
Aroclor 1262	ND	U	0.050	0.0085	1	09/09/14	09/17/14	KWG1412565	
Aroclor 1268	ND	U	0.050	0.0085	1	09/09/14	09/17/14	KWG1412565	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
Decachlorobiphenyl	86	43-148	09/17/14	Acceptable

Comments: _____

Client: Golder Associates, Incorporated
Project: BDC Properties/13399732
Sample Matrix: Sediment

Service Request: K1409353

Surrogate Recovery Summary
Polychlorinated Biphenyls (PCBs)

Extraction Method: EPA 3541
Analysis Method: 8082A

Units: Percent
Level: Low

<u>Sample Name</u>	<u>Lab Code</u>	<u>Sur1</u>
CB-1	K1409353-005	76
CB-2	K1409353-006	89
CB-3	K1409353-007	74
CB-4	K1409353-008	92
CB-5	K1409353-009	76
CB-6	K1409353-010	83
CB-7	K1409353-011	85
CB-8	K1409353-012	82
CB-9	K1409353-013	109
CB-10	K1409353-014	79
Method Blank	KWG1412565-4	86
CB-10MS	KWG1412565-1	74
CB-10DMS	KWG1412565-2	72
Lab Control Sample	KWG1412565-3	81

Surrogate Recovery Control Limits (%)

Sur1 = Decachlorobiphenyl 43-148

Results flagged with an asterisk (*) indicate values outside control criteria.

Results flagged with a pound (#) indicate the control criteria is not applicable.

QA/QC Report

Client: Golder Associates, Incorporated
Project: BDC Properties/13399732
Sample Matrix: Sediment

Service Request: K1409353
Date Extracted: 09/09/2014
Date Analyzed: 09/17/2014

Matrix Spike/Duplicate Matrix Spike Summary
Polychlorinated Biphenyls (PCBs)

Sample Name: CB-10
Lab Code: K1409353-014
Extraction Method: EPA 3541
Analysis Method: 8082A

Units: mg/Kg
Basis: Dry
Level: Low
Extraction Lot: KWG1412565

Analyte Name	Sample Result	CB-10MS KWG1412565-1 Matrix Spike			CB-10DMS KWG1412565-2 Duplicate Matrix Spike			%Rec Limits	RPD	RPD Limit
		Result	Spike Amount	%Rec	Result	Spike Amount	%Rec			
Aroclor 1016	ND	0.646	0.844	76	0.580	0.842	69	23-145	11	40
Aroclor 1260	0.066	0.663	0.844	71	0.631	0.842	67	24-148	5	40

Results flagged with an asterisk (*) indicate values outside control criteria.

Results flagged with a pound (#) indicate the control criteria is not applicable.

Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

QA/QC Report

Client: Golder Associates, Incorporated
Project: BDC Properties/13399732
Sample Matrix: Sediment

Service Request: K1409353
Date Extracted: 09/09/2014
Date Analyzed: 09/17/2014

Lab Control Spike Summary
Polychlorinated Biphenyls (PCBs)

Extraction Method: EPA 3541
Analysis Method: 8082A

Units: mg/Kg
Basis: Dry
Level: Low
Extraction Lot: KWG1412565

Lab Control Sample
KWG1412565-3
Lab Control Spike

Analyte Name	Result	Spike Amount	%Rec	%Rec Limits
Aroclor 1016	0.588	1.00	59	42-122
Aroclor 1260	0.690	1.00	69	50-124

Results flagged with an asterisk (*) indicate values outside control criteria.

Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

Analytical Results

Client: Golder Associates, Incorporated
Project: BDC Properties/13399732
Sample Matrix: Sediment

Service Request: K1409353
Date Collected: 09/02/2014
Date Received: 09/03/2014

Polynuclear Aromatic Hydrocarbons

Sample Name: Comp 1
Lab Code: K1409353-001
Extraction Method: EPA 3541
Analysis Method: 8270D SIM

Units: ug/Kg
Basis: Dry
Level: Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Naphthalene	270		4.5	0.60	1	09/04/14	09/10/14	KWG1412277	
2-Methylnaphthalene	1100		4.5	0.39	1	09/04/14	09/10/14	KWG1412277	
Acenaphthylene	41		4.5	0.59	1	09/04/14	09/10/14	KWG1412277	
Acenaphthene	1300		4.5	0.76	1	09/04/14	09/10/14	KWG1412277	
Fluorene	810		4.5	0.61	1	09/04/14	09/10/14	KWG1412277	
Phenanthrene	4300	D	23	7.0	5	09/04/14	09/09/14	KWG1412277	
Anthracene	770		4.5	0.58	1	09/04/14	09/10/14	KWG1412277	
Fluoranthene	3900	D	23	4.9	5	09/04/14	09/09/14	KWG1412277	
Pyrene	2800	D	23	3.8	5	09/04/14	09/09/14	KWG1412277	
Benz(a)anthracene	900	D	23	3.6	5	09/04/14	09/09/14	KWG1412277	
Chrysene	1500	D	23	4.0	5	09/04/14	09/09/14	KWG1412277	
Benzo(b)fluoranthene	1200	D	23	4.6	5	09/04/14	09/09/14	KWG1412277	
Benzo(k)fluoranthene	460	D	23	4.4	5	09/04/14	09/09/14	KWG1412277	
Benzo(a)pyrene	760	D	23	3.8	5	09/04/14	09/09/14	KWG1412277	
Indeno(1,2,3-cd)pyrene	560	D	23	4.4	5	09/04/14	09/09/14	KWG1412277	
Dibenz(a,h)anthracene	120	D	23	4.0	5	09/04/14	09/09/14	KWG1412277	
Benzo(g,h,i)perylene	610	D	23	4.3	5	09/04/14	09/09/14	KWG1412277	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
Fluorene-d10	76	17-104	09/10/14	Acceptable
Fluoranthene-d10	70	27-106	09/10/14	Acceptable
Terphenyl-d14	80	35-109	09/10/14	Acceptable

Comments: _____

Analytical Results

Client: Golder Associates, Incorporated
Project: BDC Properties/13399732
Sample Matrix: Sediment

Service Request: K1409353
Date Collected: 09/02/2014
Date Received: 09/03/2014

Polynuclear Aromatic Hydrocarbons

Sample Name: Comp 2
Lab Code: K1409353-002
Extraction Method: EPA 3541
Analysis Method: 8270D SIM

Units: ug/Kg
Basis: Dry
Level: Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Naphthalene	380		5.0	0.60	1	09/04/14	09/10/14	KWG1412277	
2-Methylnaphthalene	1800		5.0	0.39	1	09/04/14	09/10/14	KWG1412277	
Acenaphthylene	72		5.0	0.59	1	09/04/14	09/10/14	KWG1412277	
Acenaphthene	2700	D	25	3.8	5	09/04/14	09/09/14	KWG1412277	
Fluorene	1500		5.0	0.61	1	09/04/14	09/10/14	KWG1412277	
Phenanthrene	7900	D	25	7.0	5	09/04/14	09/09/14	KWG1412277	
Anthracene	1500		5.0	0.58	1	09/04/14	09/10/14	KWG1412277	
Fluoranthene	6900	D	25	4.9	5	09/04/14	09/09/14	KWG1412277	
Pyrene	5600	D	25	3.8	5	09/04/14	09/09/14	KWG1412277	
Benz(a)anthracene	2200	D	25	3.6	5	09/04/14	09/09/14	KWG1412277	
Chrysene	3100	D	25	4.0	5	09/04/14	09/09/14	KWG1412277	
Benzo(b)fluoranthene	3000	D	25	4.6	5	09/04/14	09/09/14	KWG1412277	
Benzo(k)fluoranthene	1100	D	25	4.4	5	09/04/14	09/09/14	KWG1412277	
Benzo(a)pyrene	2000	D	25	3.8	5	09/04/14	09/09/14	KWG1412277	
Indeno(1,2,3-cd)pyrene	1300	D	25	4.4	5	09/04/14	09/09/14	KWG1412277	
Dibenz(a,h)anthracene	300	D	25	4.0	5	09/04/14	09/09/14	KWG1412277	
Benzo(g,h,i)perylene	1500	D	25	4.3	5	09/04/14	09/09/14	KWG1412277	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
Fluorene-d10	77	17-104	09/10/14	Acceptable
Fluoranthene-d10	67	27-106	09/10/14	Acceptable
Terphenyl-d14	86	35-109	09/09/14	Acceptable

Comments: _____

Analytical Results

Client: Golder Associates, Incorporated
Project: BDC Properties/13399732
Sample Matrix: Sediment

Service Request: K1409353
Date Collected: 09/02/2014
Date Received: 09/03/2014

Polynuclear Aromatic Hydrocarbons

Sample Name: Comp 4
Lab Code: K1409353-003
Extraction Method: EPA 3541
Analysis Method: 8270D SIM

Units: ug/Kg
Basis: Dry
Level: Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Naphthalene	88		5.8	0.69	1	09/04/14	09/10/14	KWG1412277	
2-Methylnaphthalene	94		5.8	0.45	1	09/04/14	09/10/14	KWG1412277	
Acenaphthylene	30		5.8	0.68	1	09/04/14	09/10/14	KWG1412277	
Acenaphthene	82		5.8	0.87	1	09/04/14	09/10/14	KWG1412277	
Fluorene	120		5.8	0.70	1	09/04/14	09/10/14	KWG1412277	
Phenanthrene	920		5.8	1.7	1	09/04/14	09/10/14	KWG1412277	
Anthracene	110		5.8	0.67	1	09/04/14	09/10/14	KWG1412277	
Fluoranthene	1000	D	29	5.7	5	09/04/14	09/09/14	KWG1412277	
Pyrene	1700	D	29	4.4	5	09/04/14	09/09/14	KWG1412277	
Benz(a)anthracene	300	D	29	4.2	5	09/04/14	09/09/14	KWG1412277	
Chrysene	500	D	29	4.6	5	09/04/14	09/09/14	KWG1412277	
Benzo(b)fluoranthene	490	D	29	5.3	5	09/04/14	09/09/14	KWG1412277	
Benzo(k)fluoranthene	120	D	29	5.0	5	09/04/14	09/09/14	KWG1412277	
Benzo(a)pyrene	320	D	29	4.4	5	09/04/14	09/09/14	KWG1412277	
Indeno(1,2,3-cd)pyrene	220	D	29	5.0	5	09/04/14	09/09/14	KWG1412277	
Dibenz(a,h)anthracene	65	D	29	4.6	5	09/04/14	09/09/14	KWG1412277	
Benzo(g,h,i)perylene	720	D	29	4.9	5	09/04/14	09/09/14	KWG1412277	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
Fluorene-d10	76	17-104	09/10/14	Acceptable
Fluoranthene-d10	77	27-106	09/09/14	Acceptable
Terphenyl-d14	83	35-109	09/09/14	Acceptable

Comments: _____

Analytical Results

Client: Golder Associates, Incorporated
Project: BDC Properties/13399732
Sample Matrix: Sediment

Service Request: K1409353
Date Collected: 09/02/2014
Date Received: 09/03/2014

Polynuclear Aromatic Hydrocarbons

Sample Name: Comp 5
Lab Code: K1409353-004
Extraction Method: EPA 3541
Analysis Method: 8270D SIM

Units: ug/Kg
Basis: Dry
Level: Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Naphthalene	290		5.3	0.64	1	09/04/14	09/10/14	KWG1412277	
2-Methylnaphthalene	330		5.3	0.42	1	09/04/14	09/10/14	KWG1412277	
Acenaphthylene	19		5.3	0.63	1	09/04/14	09/10/14	KWG1412277	
Acenaphthene	40		5.3	0.81	1	09/04/14	09/10/14	KWG1412277	
Fluorene	66		5.3	0.65	1	09/04/14	09/10/14	KWG1412277	
Phenanthrene	560		5.3	1.5	1	09/04/14	09/10/14	KWG1412277	
Anthracene	43		5.3	0.62	1	09/04/14	09/10/14	KWG1412277	
Fluoranthene	560		5.3	1.1	1	09/04/14	09/10/14	KWG1412277	
Pyrene	880		5.3	0.81	1	09/04/14	09/10/14	KWG1412277	*
Benz(a)anthracene	150	D	27	3.8	5	09/04/14	09/09/14	KWG1412277	
Chrysene	320	D	27	4.3	5	09/04/14	09/09/14	KWG1412277	
Benzo(b)fluoranthene	330	D	27	4.9	5	09/04/14	09/09/14	KWG1412277	
Benzo(k)fluoranthene	100	D	27	4.6	5	09/04/14	09/09/14	KWG1412277	
Benzo(a)pyrene	160	D	27	4.1	5	09/04/14	09/09/14	KWG1412277	
Indeno(1,2,3-cd)pyrene	160	D	27	4.6	5	09/04/14	09/09/14	KWG1412277	
Dibenz(a,h)anthracene	40	D	27	4.3	5	09/04/14	09/09/14	KWG1412277	
Benzo(g,h,i)perylene	350	D	27	4.5	5	09/04/14	09/09/14	KWG1412277	

* See Case Narrative

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
Fluorene-d10	77	17-104	09/10/14	Acceptable
Fluoranthene-d10	72	27-106	09/10/14	Acceptable
Terphenyl-d14	78	35-109	09/09/14	Acceptable

Comments: _____

Analytical Results

Client: Golder Associates, Incorporated
Project: BDC Properties/13399732
Sample Matrix: Sediment

Service Request: K1409353
Date Collected: 09/02/2014
Date Received: 09/03/2014

Polynuclear Aromatic Hydrocarbons

Sample Name: CB-3
Lab Code: K1409353-007
Extraction Method: EPA 3541
Analysis Method: 8270D SIM

Units: ug/Kg
Basis: Dry
Level: Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Naphthalene	130	D	26	3.1	5	09/04/14	09/09/14	KWG1412277	
2-Methylnaphthalene	190	D	26	2.0	5	09/04/14	09/09/14	KWG1412277	
Acenaphthylene	47	D	26	3.0	5	09/04/14	09/09/14	KWG1412277	
Acenaphthene	43	D	26	3.9	5	09/04/14	09/09/14	KWG1412277	
Fluorene	130	D	26	3.1	5	09/04/14	09/09/14	KWG1412277	
Phenanthrene	890	D	26	7.2	5	09/04/14	09/09/14	KWG1412277	
Anthracene	64	D	26	3.0	5	09/04/14	09/09/14	KWG1412277	
Fluoranthene	860	D	26	5.0	5	09/04/14	09/09/14	KWG1412277	
Pyrene	1600	D	26	3.9	5	09/04/14	09/09/14	KWG1412277	
Benz(a)anthracene	220	D	26	3.7	5	09/04/14	09/09/14	KWG1412277	
Chrysene	790	DX	26	4.1	5	09/04/14	09/09/14	KWG1412277	J
Benzo(b)fluoranthene	420	D	26	4.7	5	09/04/14	09/09/14	KWG1412277	
Benzo(k)fluoranthene	89	D	26	4.5	5	09/04/14	09/09/14	KWG1412277	
Benzo(a)pyrene	270	D	26	3.9	5	09/04/14	09/09/14	KWG1412277	
Indeno(1,2,3-cd)pyrene	210	D	26	4.5	5	09/04/14	09/09/14	KWG1412277	
Dibenz(a,h)anthracene	61	D	26	4.1	5	09/04/14	09/09/14	KWG1412277	
Benzo(g,h,i)perylene	740	D	26	4.4	5	09/04/14	09/09/14	KWG1412277	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
Fluorene-d10	80	17-104	09/09/14	Acceptable
Fluoranthene-d10	79	27-106	09/09/14	Acceptable
Terphenyl-d14	78	35-109	09/09/14	Acceptable

Comments: _____

Analytical Results

Client: Golder Associates, Incorporated
Project: BDC Properties/13399732
Sample Matrix: Sediment

Service Request: K1409353
Date Collected: 09/02/2014
Date Received: 09/03/2014

Polynuclear Aromatic Hydrocarbons

Sample Name: CB-4
Lab Code: K1409353-008
Extraction Method: EPA 3541
Analysis Method: 8270D SIM

Units: ug/Kg
Basis: Dry
Level: Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Naphthalene	110		6.0	0.72	1	09/04/14	09/10/14	KWG1412277	
2-Methylnaphthalene	120		6.0	0.47	1	09/04/14	09/10/14	KWG1412277	
Acenaphthylene	35		6.0	0.71	1	09/04/14	09/10/14	KWG1412277	
Acenaphthene	48		6.0	0.92	1	09/04/14	09/10/14	KWG1412277	
Fluorene	78		6.0	0.74	1	09/04/14	09/10/14	KWG1412277	
Phenanthrene	820		6.0	1.7	1	09/04/14	09/10/14	KWG1412277	
Anthracene	100		6.0	0.70	1	09/04/14	09/10/14	KWG1412277	
Fluoranthene	1000	D	30	5.9	5	09/04/14	09/09/14	KWG1412277	
Pyrene	1500	D	30	4.6	5	09/04/14	09/09/14	KWG1412277	
Benz(a)anthracene	230	D	30	4.4	5	09/04/14	09/09/14	KWG1412277	
Chrysene	800	DX J	30	4.8	5	09/04/14	09/09/14	KWG1412277	
Benzo(b)fluoranthene	610	DX J	30	5.6	5	09/04/14	09/09/14	KWG1412277	
Benzo(k)fluoranthene	ND	UX JJ	30	5.3	5	09/04/14	09/09/14	KWG1412277	
Benzo(a)pyrene	270	D	30	4.6	5	09/04/14	09/09/14	KWG1412277	
Indeno(1,2,3-cd)pyrene	220	D	30	5.3	5	09/04/14	09/09/14	KWG1412277	
Dibenz(a,h)anthracene	48	D	30	4.8	5	09/04/14	09/09/14	KWG1412277	
Benzo(g,h,i)perylene	610	D	30	5.1	5	09/04/14	09/09/14	KWG1412277	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
Fluorene-d10	80	17-104	09/10/14	Acceptable
Fluoranthene-d10	84	27-106	09/09/14	Acceptable
Terphenyl-d14	82	35-109	09/09/14	Acceptable

Comments: _____

Analytical Results

Client: Golder Associates, Incorporated
Project: BDC Properties/13399732
Sample Matrix: Sediment

Service Request: K1409353
Date Collected: 09/02/2014
Date Received: 09/03/2014

Polynuclear Aromatic Hydrocarbons

Sample Name: Duplicate
Lab Code: K1409353-015
Extraction Method: EPA 3541
Analysis Method: 8270D SIM

Units: ug/Kg
Basis: Dry
Level: Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Naphthalene	600	D	46	6.0	10	09/04/14	09/09/14	KWG1412277	
2-Methylnaphthalene	2700	D	46	3.9	10	09/04/14	09/09/14	KWG1412277	
Acenaphthylene	120	D	46	5.9	10	09/04/14	09/09/14	KWG1412277	
Acenaphthene	4400	D	46	7.6	10	09/04/14	09/09/14	KWG1412277	
Fluorene	3000	D	46	6.1	10	09/04/14	09/09/14	KWG1412277	
Phenanthrene	15000	D	46	14	10	09/04/14	09/09/14	KWG1412277	
Anthracene	3100	D	46	5.8	10	09/04/14	09/09/14	KWG1412277	
Fluoranthene	12000	D	46	9.8	10	09/04/14	09/09/14	KWG1412277	
Pyrene	9700	D	46	7.6	10	09/04/14	09/09/14	KWG1412277	
Benz(a)anthracene	3900	D	46	7.2	10	09/04/14	09/09/14	KWG1412277	
Chrysene	4900	D	46	8.0	10	09/04/14	09/09/14	KWG1412277	
Benzo(b)fluoranthene	4900	D	46	9.2	10	09/04/14	09/09/14	KWG1412277	
Benzo(k)fluoranthene	1700	D	46	8.7	10	09/04/14	09/09/14	KWG1412277	
Benzo(a)pyrene	3400	D	46	7.6	10	09/04/14	09/09/14	KWG1412277	
Indeno(1,2,3-cd)pyrene	2100	D	46	8.7	10	09/04/14	09/09/14	KWG1412277	
Dibenz(a,h)anthracene	460	D	46	8.0	10	09/04/14	09/09/14	KWG1412277	
Benzo(g,h,i)perylene	2200	D	46	8.5	10	09/04/14	09/09/14	KWG1412277	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
Fluorene-d10	90	17-104	09/09/14	Acceptable
Fluoranthene-d10	89	27-106	09/09/14	Acceptable
Terphenyl-d14	96	35-109	09/09/14	Acceptable

Comments: _____

Analytical Results

Client: Golder Associates, Incorporated
Project: BDC Properties/13399732
Sample Matrix: Sediment

Service Request: K1409353
Date Collected: NA
Date Received: NA

Polynuclear Aromatic Hydrocarbons

Sample Name: Method Blank
Lab Code: KWG1412277-5
Extraction Method: EPA 3541
Analysis Method: 8270D SIM

Units: ug/Kg
Basis: Dry
Level: Low

Analyte Name	Result	Q	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Extraction Lot	Note
Naphthalene	ND	U	2.5	0.60	1	09/04/14	09/09/14	KWG1412277	
2-Methylnaphthalene	ND	U	2.5	0.39	1	09/04/14	09/09/14	KWG1412277	
Acenaphthylene	ND	U	2.5	0.59	1	09/04/14	09/09/14	KWG1412277	
Acenaphthene	ND	U	2.5	0.76	1	09/04/14	09/09/14	KWG1412277	
Fluorene	ND	U	2.5	0.61	1	09/04/14	09/09/14	KWG1412277	
Phenanthrene	ND	U	2.5	1.4	1	09/04/14	09/09/14	KWG1412277	
Anthracene	ND	U	2.5	0.58	1	09/04/14	09/09/14	KWG1412277	
Fluoranthene	ND	U	2.5	0.98	1	09/04/14	09/09/14	KWG1412277	
Pyrene	ND	U	2.5	0.76	1	09/04/14	09/09/14	KWG1412277	
Benz(a)anthracene	ND	U	2.5	0.72	1	09/04/14	09/09/14	KWG1412277	
Chrysene	ND	U	2.5	0.80	1	09/04/14	09/09/14	KWG1412277	
Benzo(b)fluoranthene	ND	U	2.5	0.92	1	09/04/14	09/09/14	KWG1412277	
Benzo(k)fluoranthene	ND	U	2.5	0.87	1	09/04/14	09/09/14	KWG1412277	
Benzo(a)pyrene	ND	U	2.5	0.76	1	09/04/14	09/09/14	KWG1412277	
Indeno(1,2,3-cd)pyrene	ND	U	2.5	0.87	1	09/04/14	09/09/14	KWG1412277	
Dibenz(a,h)anthracene	ND	U	2.5	0.80	1	09/04/14	09/09/14	KWG1412277	
Benzo(g,h,i)perylene	ND	U	2.5	0.85	1	09/04/14	09/09/14	KWG1412277	

Surrogate Name	%Rec	Control Limits	Date Analyzed	Note
Fluorene-d10	70	17-104	09/09/14	Acceptable
Fluoranthene-d10	74	27-106	09/09/14	Acceptable
Terphenyl-d14	74	35-109	09/09/14	Acceptable

Comments: _____

Client: Golder Associates, Incorporated
Project: BDC Properties/13399732
Sample Matrix: Sediment

Service Request: K1409353

Surrogate Recovery Summary
Polynuclear Aromatic Hydrocarbons

Extraction Method: EPA 3541
Analysis Method: 8270D SIM

Units: Percent
Level: Low

<u>Sample Name</u>	<u>Lab Code</u>	<u>Sur1</u>	<u>Sur2</u>	<u>Sur3</u>
Comp 1	K1409353-001	76	70	80
Comp 2	K1409353-002	77	67	86 D
Comp 4	K1409353-003	76	77 D	83 D
Comp 5	K1409353-004	77	72	78 D
CB-3	K1409353-007	80 D	79 D	78 D
CB-4	K1409353-008	80	84 D	82 D
Duplicate	K1409353-015	90 D	89 D	96 D
Method Blank	KWG1412277-5	70	74	74
CB-4MS	KWG1412277-1	74 D	60 D	78 D
CB-4DMS	KWG1412277-2	80 D	83 D	85 D
Lab Control Sample	KWG1412277-3	63	67	65
Duplicate Lab Control Sample	KWG1412277-4	61	66	65

Surrogate Recovery Control Limits (%)

Sur1 = Fluorene-d10	17-104
Sur2 = Fluoranthene-d10	27-106
Sur3 = Terphenyl-d14	35-109

Results flagged with an asterisk (*) indicate values outside control criteria.

Results flagged with a pound (#) indicate the control criteria is not applicable.

QA/QC Report

Client: Golder Associates, Incorporated
Project: BDC Properties/13399732
Sample Matrix: Sediment

Service Request: K1409353
Date Extracted: 09/04/2014
Date Analyzed: 09/10/2014 -
 09/12/2014

Matrix Spike/Duplicate Matrix Spike Summary
Polynuclear Aromatic Hydrocarbons

Sample Name: CB-4
Lab Code: K1409353-008
Extraction Method: EPA 3541
Analysis Method: 8270D SIM

Units: ug/Kg
Basis: Dry
Level: Low
Extraction Lot: KWG1412277

Analyte Name	Sample Result	CB-4MS KWG1412277-1 Matrix Spike			CB-4DMS KWG1412277-2 Duplicate Matrix Spike			%Rec Limits	RPD	RPD Limit
		Result	Spike Amount	%Rec	Result	Spike Amount	%Rec			
Naphthalene	110	417	599	51	465	599	59	23-114	11	40
2-Methylnaphthalene	120	484	599	60	541	599	70	24-115	11	40
Acenaphthylene	35	450	599	69	534	599	83	32-117	17	40
Acenaphthene	48	465	599	70	545	599	83	33-118	16	40
Fluorene	78	516	599	73	609	599	89	33-125	17	40
Phenanthrene	820	1280	599	76	1390	599	94	29-125	8	40
Anthracene	100	520	599	70	613	599	85	30-127	16	40
Fluoranthene	1000	1300	599	48	1420	599	69	35-139	9	40
Pyrene	1500	1870	599	60	1940	599	71	27-134	4	40
Benz(a)anthracene	230	618	599	65	702	599	79	35-122	13	40
Chrysene	800	1200	599	67	1300	599	83	36-126	7	40
Benzo(b)fluoranthene	610	836	599	37	972	599	60	35-124	15	40
Benzo(k)fluoranthene	5.3	534	599	89	647	599	108	38-124	19	40
Benzo(a)pyrene	270	606	599	55	692	599	70	37-123	13	40
Indeno(1,2,3-cd)pyrene	220	643	599	71	743	599	88	28-133	14	40
Dibenz(a,h)anthracene	48	359	599	52	399	599	59	32-125	11	40
Benzo(g,h,i)perylene	610	1030	599	69	1120	599	85	33-128	9	40

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Results flagged with a pound (#) indicate the control criteria is not applicable.

Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

Client: Golder Associates, Incorporated
Project: BDC Properties/13399732
Sample Matrix: Sediment

Service Request: K1409353
Date Extracted: 09/04/2014
Date Analyzed: 09/09/2014

Lab Control Spike/Duplicate Lab Control Spike Summary
Polynuclear Aromatic Hydrocarbons

Extraction Method: EPA 3541
Analysis Method: 8270D SIM

Units: ug/Kg
Basis: Dry
Level: Low
Extraction Lot: KWG1412277

Analyte Name	Lab Control Sample KWG1412277-3 Lab Control Spike			Duplicate Lab Control Sample KWG1412277-4 Duplicate Lab Control Spike			%Rec Limits	RPD	RPD Limit
	Result	Spike Amount	%Rec	Result	Spike Amount	%Rec			
Naphthalene	343	500	69	275	500	55	32-124	22	40
2-Methylnaphthalene	362	500	72	281	500	56	27-126	25	40
Acenaphthylene	360	500	72	302	500	60	38-126	18	40
Acenaphthene	363	500	73	309	500	62	39-124	16	40
Fluorene	364	500	73	328	500	66	39-129	11	40
Phenanthrene	372	500	74	320	500	64	39-123	15	40
Anthracene	373	500	75	320	500	64	38-130	15	40
Fluoranthene	374	500	75	325	500	65	39-135	14	40
Pyrene	374	500	75	338	500	68	39-134	10	40
Benz(a)anthracene	373	500	75	328	500	66	46-120	13	40
Chrysene	396	500	79	348	500	70	49-120	13	40
Benzo(b)fluoranthene	402	500	80	353	500	71	51-121	13	40
Benzo(k)fluoranthene	388	500	78	346	500	69	55-120	11	40
Benzo(a)pyrene	367	500	73	324	500	65	49-122	13	40
Indeno(1,2,3-cd)pyrene	349	500	70	308	500	62	40-128	13	40
Dibenz(a,h)anthracene	332	500	66	292	500	58	43-125	13	40
Benzo(g,h,i)perylene	351	500	70	314	500	63	49-122	11	40

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